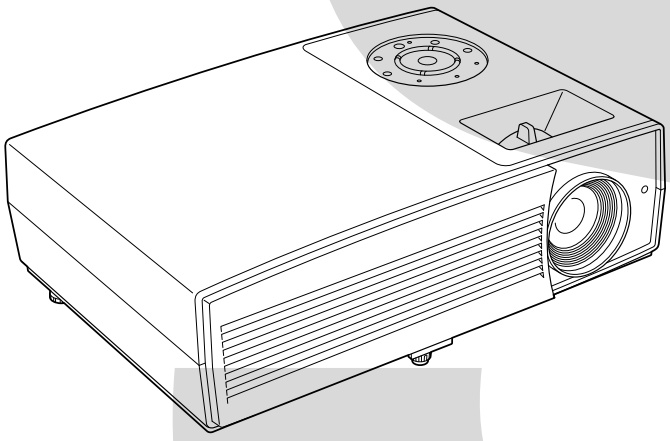
TOSHIBA

FILE NO. 330-200602GR
Rev.02

SERVICE MANUAL

DLP DATA PROJECTOR

TDP-T95E,TDP-T95B
TDP-T95U,TDP-T95C
TDP-T100E,TDP-T100B
TDP-T100U,TDP-T100C



The above models are classified as green product (s) (*1), as indicated by the underlined serial number (s).
This Service Manual describes replacement parts for green product (s). When repairing any green product (s), use the parts described in this manual and lead-free solder (*2).
For (*1) and (*2) , see the next page.

Published in Japan, Februry 2006 GREEN

(*1) GREEN PRODUCT PROCUREMENT

The EC is actively promoting the WEEE & RoHS Directives that define standards for recycling and reuse of Waste Electrical and Electronic Equipment and for the Restriction of the use of certain Hazardous Substances. From July 1, 2006, the RoHS Directive will prohibit any marketing of new products containing the restricted substances.

Increasing attention is given to issues related to the global environmental. Toshiba Corporation recognizes environmental protection as a key management tasks, and is doing its utmost to enhance and improve the quality and scope of its environmental activities. In line with this, Toshiba proactively promotes Green Procurement, and seeks to purchase and use products, parts and materials that have low environmental impacts.

Green procurement of parts is not only confined to manufacture. The same green parts used in manufacture must also be used as replacement parts.

(*2) LEAD-FREE SOLDER

This product is manufactured using lead-free solder as a part of a movement within the consumer products industry at large to be environmentally responsible. Lead-free solder must be used in the servicing and repair of this product.

WARNING

This product is manufactured using lead free solder.

DO NOT USE LEAD BASED SOLDER TO REPAIR THIS PRODUCT !

The melting temperature of lead-free solder is higher than that of leaded solder by 86°F to 104°F (30°C to 40°C). Use of a soldering iron designed for lead-based solders to repair product made with lead-free solder may result in damage to the component and or PCB being soldered. Great care should be made to ensure high-quality soldering when servicing this product — especially when soldering large components, through-hole pins, and on PCBs — as the level of heat required to melt lead-free solder is high.

Table of Contents

Contents

Specifications

■ List of general specifications

Item		Specification
Consumption Power		TDP-T95: 310 W
		TDP-T100: 380 W
Weight		TDP-T95: 2.9 kg
		TDP-T100: 3.0 kg
External Dimensions (including protruding parts)		300 × 99 × 218 mm (W × H × D)
Cabinet material		PC+ABS resin and ABS resin
Conditions for usage environment		Temp: 5°C to 35°C; relative humidity: 30% to 70%
Display pixels		1 chip DMD™
Picture elements		786,432 pixels (1024H × 768V)
Lens		Zoom lens F=2.07-2.64 f=20.5-32.8 mm
Lamp		TDP-T95: High-pressure mercury lamp (210 W)
		TDP-T100: High-pressure mercury lamp (275 W)
Projection screen size		30-300 inches
Projection distance		1.07-11.09 m
Speaker		1W (Mono)
Connection terminal	COMPUTER 1 IN terminal	Mini D sub 15 pin RGB / Y/P_B/P_R (dual use)
	COMPUTER 2 IN terminal	Mini D sub 15 pin RGB / Y/P_B/P_R (dual use)
	MONITOR terminal	Mini D sub 15 pin RGB / Y/P_B/P_R (dual use)
	S-VIDEO terminal	Mini DIN 4 pin
	AUDIO (L/R) terminal	RCA Pin Jack × 2, 1.5 V (rms), 22 kΩ or more
	VIDEO terminal	RCA Pin Jack, 1 V (p-p), 75Ω
	AUDIO (L/R) terminal	RCA Pin Jack × 2, 1.5 V (rms), 22 kΩ or more
	AUDIO IN terminal	3.5mm dia. stereo mini-jack, 1.5 V (rms), 22 kΩ or more
	AUDIO OUT terminal	3.5mm dia. stereo mini-jack
	CONTROL terminal	Mini DIN 8 pin (RS-232C)

Notes

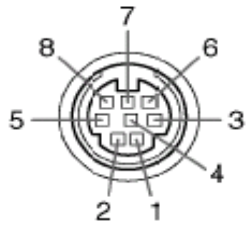
• This model complies with the above specifications.
• Designs and specifications are subject to change without notice.
• This model may not be compatible with features and/or specifications that may be added in the future.

■ Separately sold product

Replacement Lamp for TDP-T95 Model TLPLW9
Replacement Lamp for TDP-T100 Model TLPLW10

■ **CONTROL terminal**

• Pin assignment



Mini DIN 8 Pin Connector

Pin No.	Signal Name	Description
1	RXD	Receiving data
2	CTS	Consent to send
3	DSR	Data set ready
4	GND	Signal ground
5	RTS	Request to send
6	N.C	No connection
7	TXD	Sending data
8	GND	Signal ground

• Interface format

1 Communication method

RS-232C,9600bps,No Parity,Data Length: 8 bits;

Stop Bit Length: 1 bit

2 Communication format

STX(02h)	Command(3Byte)	ETX(03h)

Only 1 command valid per communication.

3 Data format

For input commands,only ASCII-compliant all-uppercase alphanumeric characters supported.

4 Replies

Acknowledge

ACK(06h)	CR (0Dh)	Data

:Normally ended

ACK (06h)	ESC (1Bh)

:Aborted

No Acknowledge

NAK (15h)

If commands are to be sent consecutively, wait for the response from the projector before sending the next command.

• Main Commands

Item	Command
Power on	PON
Power off	PDF
Icon display on	MC0
Icon display off	MO1
Auto setting (RGB input)	PAT
Status display on	DON
Status display off	DOF

Note

- Contact your dealer for control cable and other commands.

Using the Menus

You can call up on-screen menus, and conduct a number of adjustments and settings using the operation buttons on the control panel (main unit side) and remote control.

■ How to use the menus

The menu shown below is for operation instructions purposes and might differ from the actual display.

1. Press the MENU button Display the **Setting display** menu

2. Select a Category

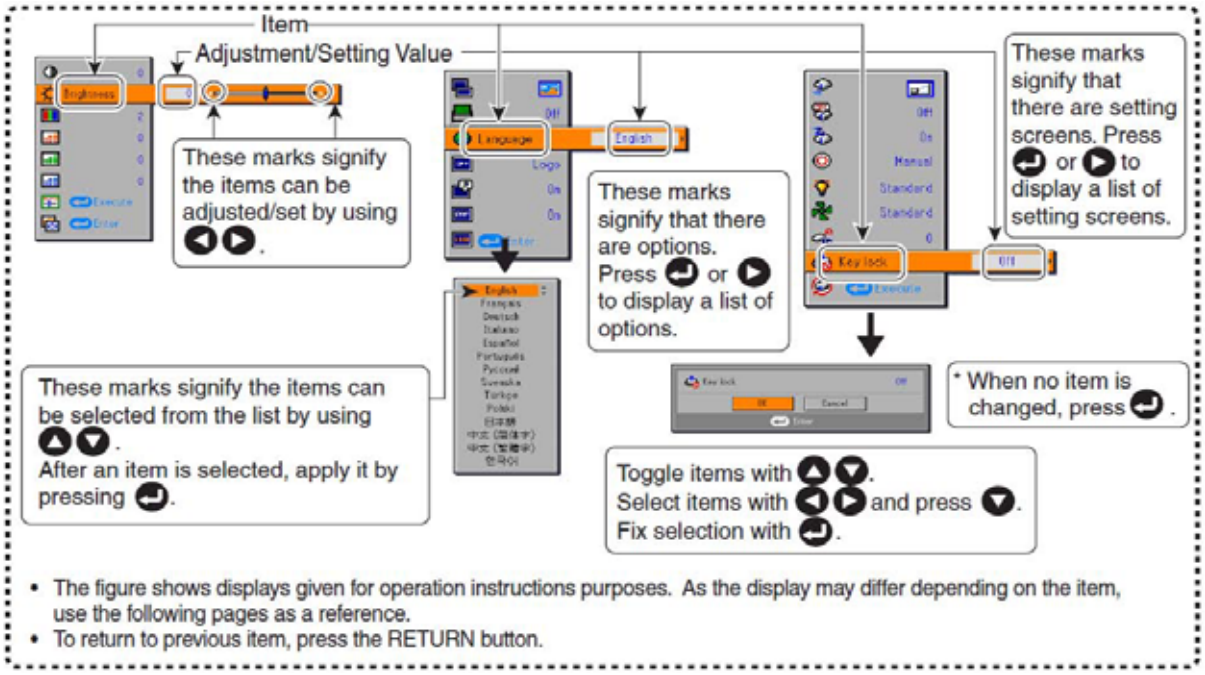
Select a Category by using ◀▶.
There are following four Categories:

- Image adjustment menu
- Display Setting menu
- Default Setting menu
- Status Display menu

Displays the current adjustments and Settings of selected Category.

Item shown with gray cannot be adjusted with the current input source

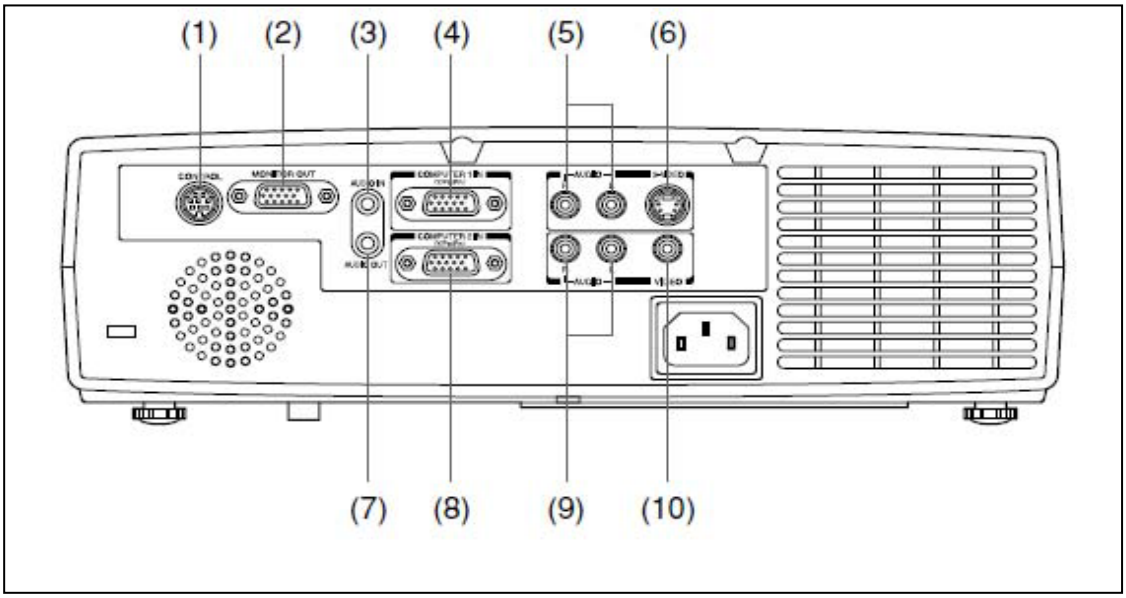
3.Adjustments & Settings Press ↵ or ▼ to open the menu.



- The figure shows displays given for operation instructions purposes. As the display may differ depending on the item, use the following pages as a reference.
- To return to previous item, press the RETURN button.

4.End Press the MENU button.
(The menu disappears 30 seconds after the last operation.)

Names of the Terminals on the Rear Panel



Name	:Main Function
(1) CONTROL terminal	: When operating the projector via a computer, connect this to the controlling computer's RS-232C port.
(2) MONITOR terminal	: Connect to a computer display, etc.
(3) AUDIO IN terminal	: Input audio signals from a computer, or from video equipment with a component video signal output terminal.
(4) COMPUTER 1 IN terminal	: Input RGB signal from a computer or other source, or a component video signal (Y/PB/PR) from video equipment.
(5) AUDIO (L/R) terminal	: Input audio signals from video equipment.
(6) S-VIDEO terminal	: Input S video signals from video equipment.
(7) AUDIO OUT terminal	: Outputs audio signals.
(8) COMPUTER 2 IN terminal	: Input analog RGB signal from a computer or other source or a component video signal (Y/PB/PR) from video equipment.
(9) AUDIO (L/R) terminal	: Input audio signals from video equipment.
(10) VIDEO terminal	: Input video signals from video equipment.

List of Supported Signals

■ List of Supported Signals(RGB signals)

This projector supports the following RGB signals. Note, however, that depending on the computer model, the screen may show flicker or streaking. Please adjust the projector if this happens.

Resolution	Mode	Refresh Rate(Hz)	H-frequency(kHz)	Clock (MHz)
720 x 400	720x400_85	85.039	37.927	35.500
640×480	VGA_60	59.940	31.469	25.175
	VGA_72	72.809	37.861	31.500
	VGA_75	75.000	37.500	31.500
	VGA_85	85.008	43.269	36.000
800 x 600	SVGA_56	56.250	35.156	36.000
	SVGA_60	60.317	37.879	40.000
	SVGA_72	72.188	48.077	50.000
	SVGA_75	75.000	46.875	49.500
	SVGA_85	85.061	53.674	56.250
832 x 624	MAC16"	74.550	49.725	57.283
1024 x 768	XGA_60	60.004	48.363	65.000
	XGA_70	70.069	56.476	75.000
	XGA_75	75.029	60.023	78.750
	XGA_85	84.997	68.667	94.500
	MAC19"	74.700	60.134	79.857
1152 x 864	SXGA1_75	75.000	67.500	108.000
1280 x 960	QuadVGA_60	60.000	60.000	108.000
	QuadVGA_85	85.002	85.938	148.500
1280 x 1024	SXGA3_60	60.020	63.981	108.000
	SXGA3_75	75.025	79.976	135.000
	SXGA3_85	85.024	91.146	157.500
1400 x 1050	SXGA+	59.978	65.317	121.750
1600 x 1200	UXGA_60	60.000	75.000	162.000
	UXGA_65	65.000	81.250	175.500
	UXGA_70	70.000	87.500	189.000
	UXGA_75	75.000	93.750	202.500
	UXGA_85	85.000	106.250	229.500

Note

- Signals whose resolution exceeds the native resolution (1024×768 pixels) will be compressed. For this reason, some information may be lost, or image quality may be affected.

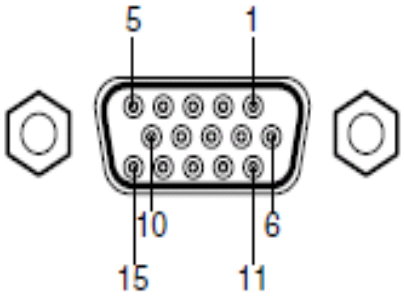
■ List of supported signals (Y/PB/PR signals)

Signal format	fh(kHz)	fv(Hz)
480i(525i)@60Hz	15.73	59.94
480p(525p)@60Hz	31.47	59.94
576i(625i)@50Hz	15.63	50.00
576p(625p)@50Hz	31.25	50.00
720p(750p)@60Hz	45.00	60.00
720p(750p)@50Hz	37.50	50.00
1080i(1125i)@60Hz	33.75	60.00
1080i(1125i)@50Hz	28.13	50.00

■ List of supported signals (Video, S-Video signals)

Video mode	fh(kHz)	fv(Hz)	fsc(MHz)
NTSC	15.73	60	3.58
PAL	15.63	50	4.43
SECAM	15.63	50	4.25 or 4.41
PAL-M	15.73	60	3.58
PAL-N	15.63	50	3.58
PAL-60	15.73	60	4.43
NTSC4.43	15.73	60	4.43

■ Pin assignment of COMPUTER 1 IN, COMPUTER 2 IN &MONITOR terminals



Mini D sub 15 Pin connector

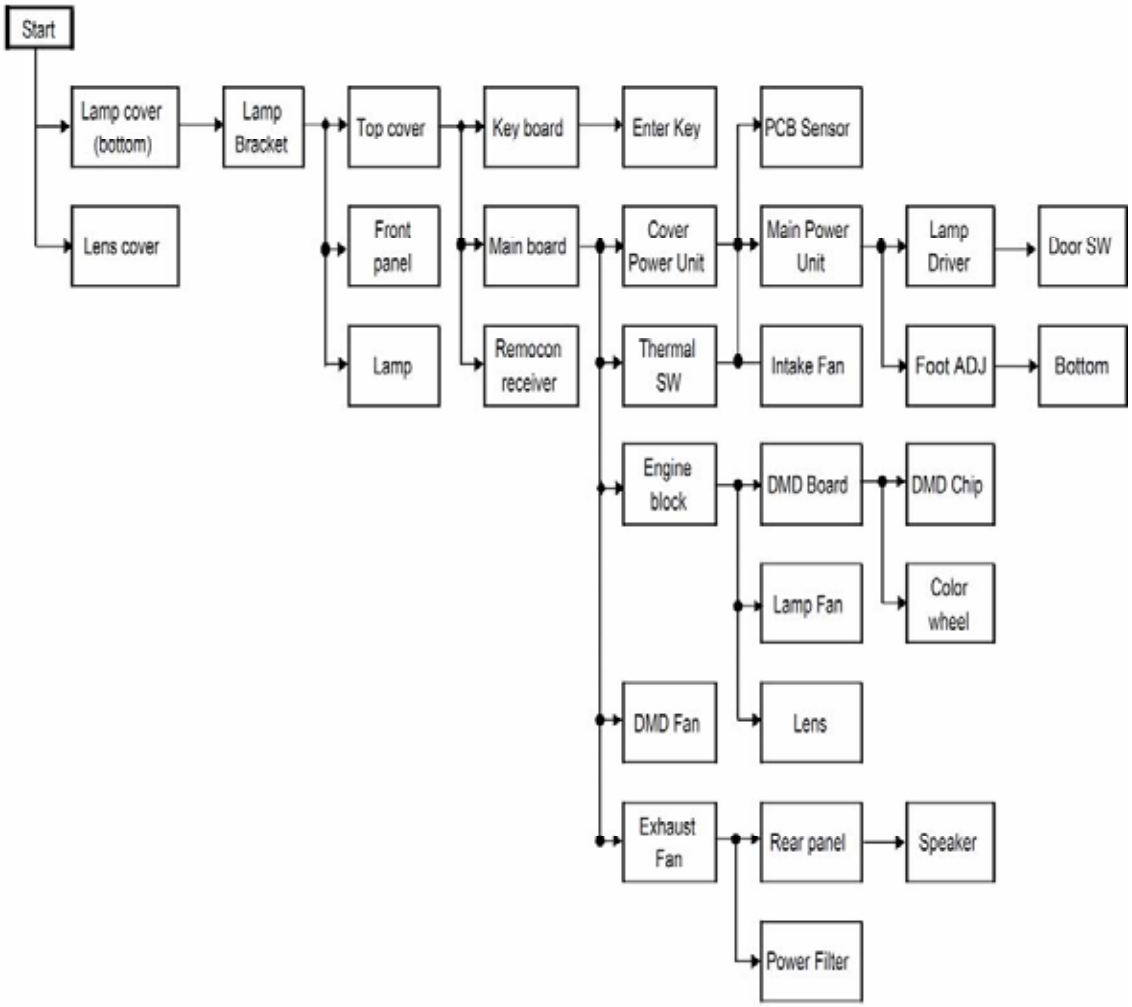
• RGB input
RGB signals :0.7V (p-p) 75 Ω
Horizontal sync signal :TTL level (Pos/neg polarity)
Vertical sync signal :TTL level (Pos/neg polarity)
• Y/PB/PR input
Y signal :1.0V (p-p) 75 Ω
PB/PR signals :0.7V (p-p) 75 Ω

Pin No.	Pin description	
	During RGB input	During Y/PB/PR input
1	Video signal (R)	Color difference signal (PR)
2	Video signal (G)	Luminance signal (Y)
3	Video signal (B)	Color difference signal (PB)
4	GND	*
5	GND	*
6	GND (R)	GND (PR)
7	GND (G)	GND (Y)
8	GND (B)	GND (PB)
9	N.C	GND
10	GND	*
11	GND	*
12	N.C	*
13	Horizontal sync signal	*
14	Vertical sync signal	*
15	N.C	*

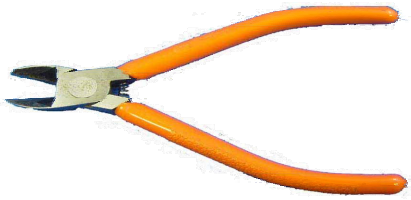
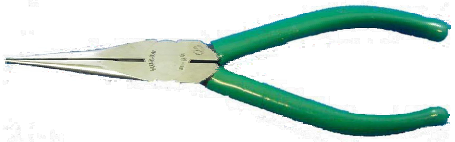
*Do not connect anything

Replaceable Part Hierarchy

The flow chart below shows what parts must be removed to access each replaceable part in the projector.
The parts on the first level (Ex. Lamp cover) are accessible without removing any other parts.
The move levels down that a part is, the more parts you need to remove in order to access it.



Required Tools

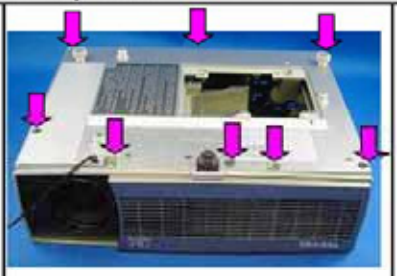
Item	Photo
Driver bit (+) No 2	
Box driver M3	
Driver bit (+) No 0	
Torque driver bit (+) No 1	
Nippers	
Cutting pliers	

Parts Replacement

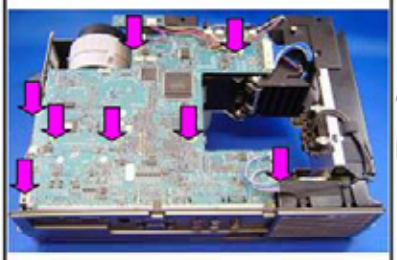
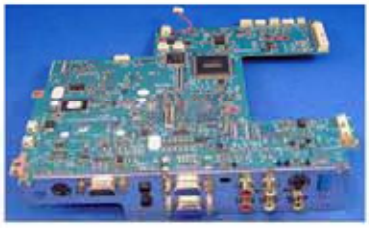
1.Lamp

No	Figure	Explanation
1	 	Remove two lamp cover screws. Remove two lamp screws.
2		Lamp is pulled out.

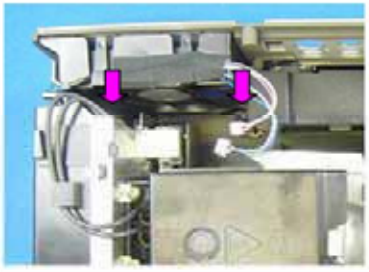
2.Front & Top Cover

1		Remove eight screws at the bottom.
2		Front cover is removed. note:There are three hooks. 
3	 	Top cover is removed. Note: After assembling Top cover and Front cover, Front cover should push two places. The imperfection of fan guard location is prevented.

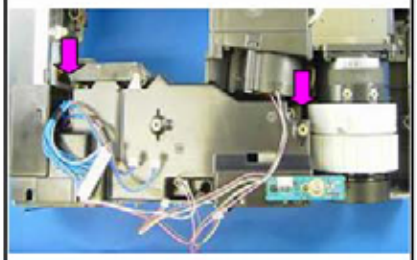
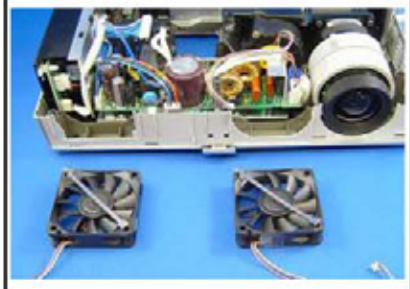
3.Main Board

Step	Figure	Explanation
1		All the connectors on a main board unit is removed. Remove eight screws.
2		Remove four screws at the rear cover.
3		Main board is removed.

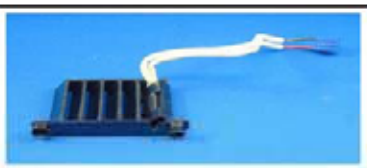
4.Exhaust Fan

		Remove two screws.
		Exhaust Fan is removed.

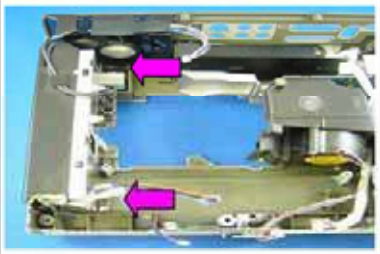
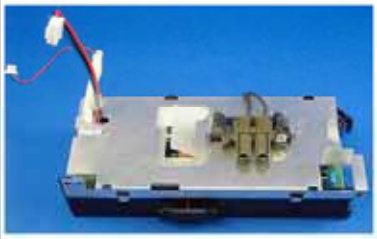
5.Main Power Unit and Exhaust Fans

Step	Figure	Explanation
1		Remove two screws.
2	 	The cover of Main Power Unit is removed. Remove a screw.
3		Sensor is removed.
4		Two Exhaust Fans are removed.
5		Main Power Unit is taken out.

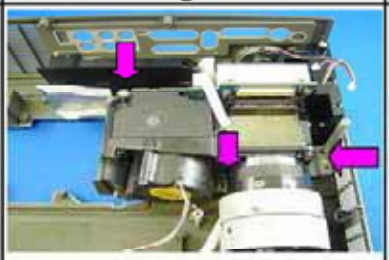
6.Thermal SW

Step	Figure	Explanation
1		Remove two screws.
2	 	Thermal SW Assy is removed. Thermal SW is removed.

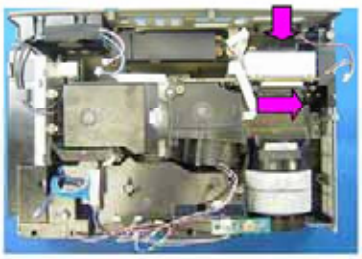
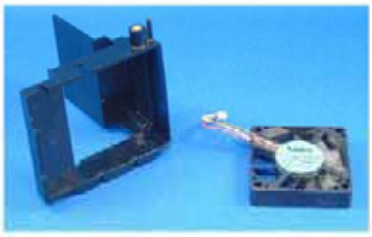
7.Lamp driver board

1		Remove two screws.
2		Lamp driver board assy is removed.
3		Lamp driver board is removed.

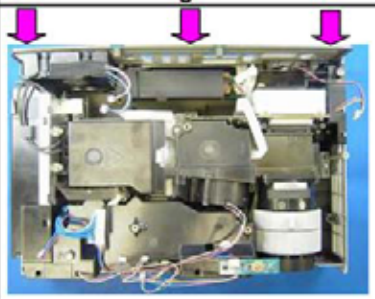
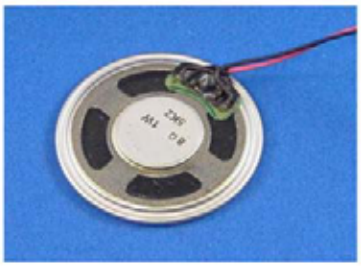
8.Engine block

Step	Figure	Explanation
1		Remove three screws.
2		Engine block is taken out from the bottom cover. Remove two screws.
3		Lamp Fan is removed.

9.DMD fan

1		Remove two screws.
2		DMD fan is removed.

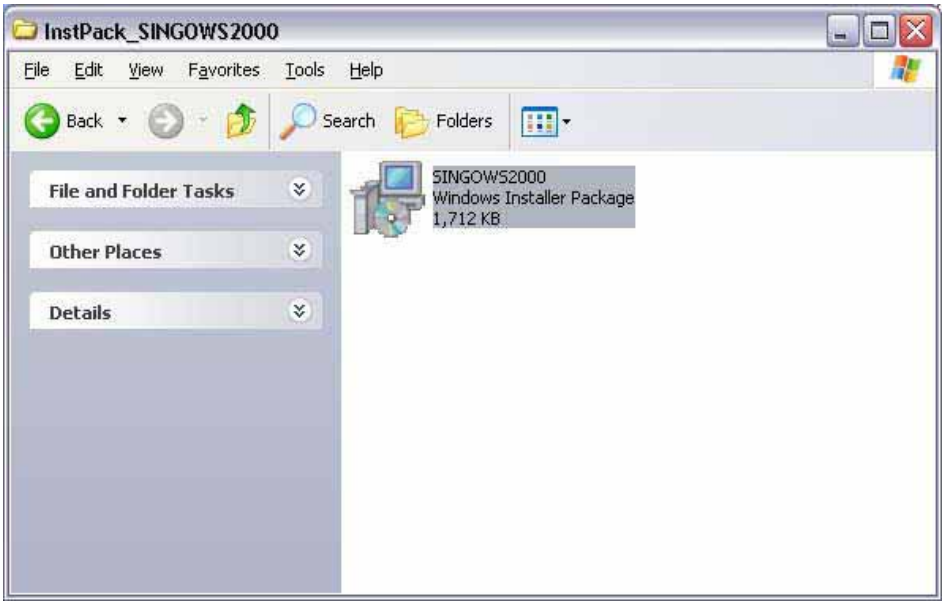
10.Rear panel and Speaker

Step	Figure	Explanation
1		Remove three screws.
3		Rear panel is removed. Remove a screw.
4		Speaker is removed.

SINGOWS 2000

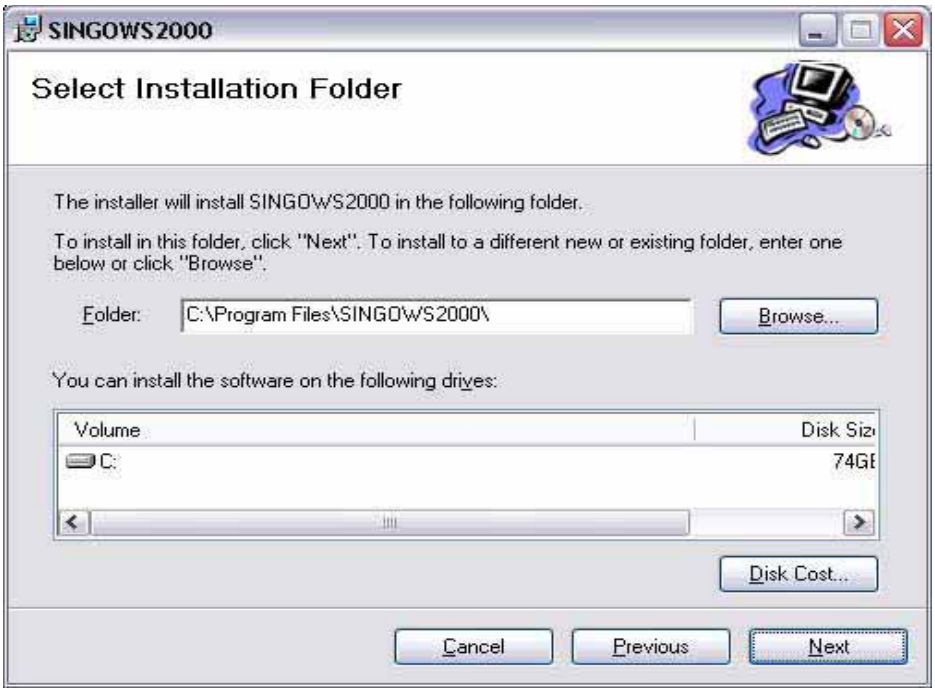
Install the Software on the Computer

The software you download is bundled into one .MSI file.
Double-click the file to install the signal generating software.

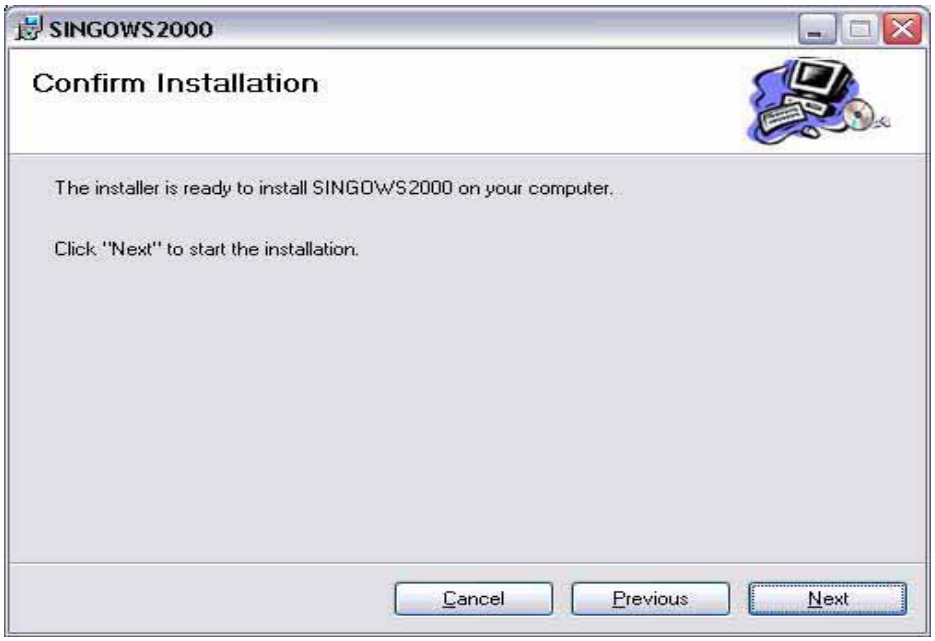


The Install Wizard appears,ready to begin the install process.
Click the next button.

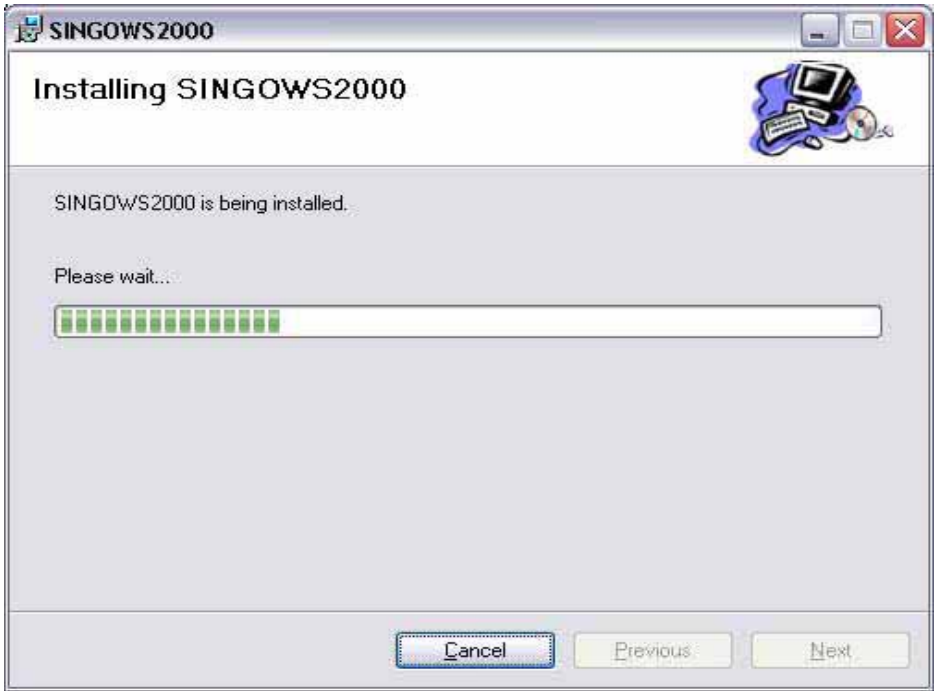
The Select Installation Folder dialog box appears.
Navigate to the location where you stored the software files.
Click the next button.



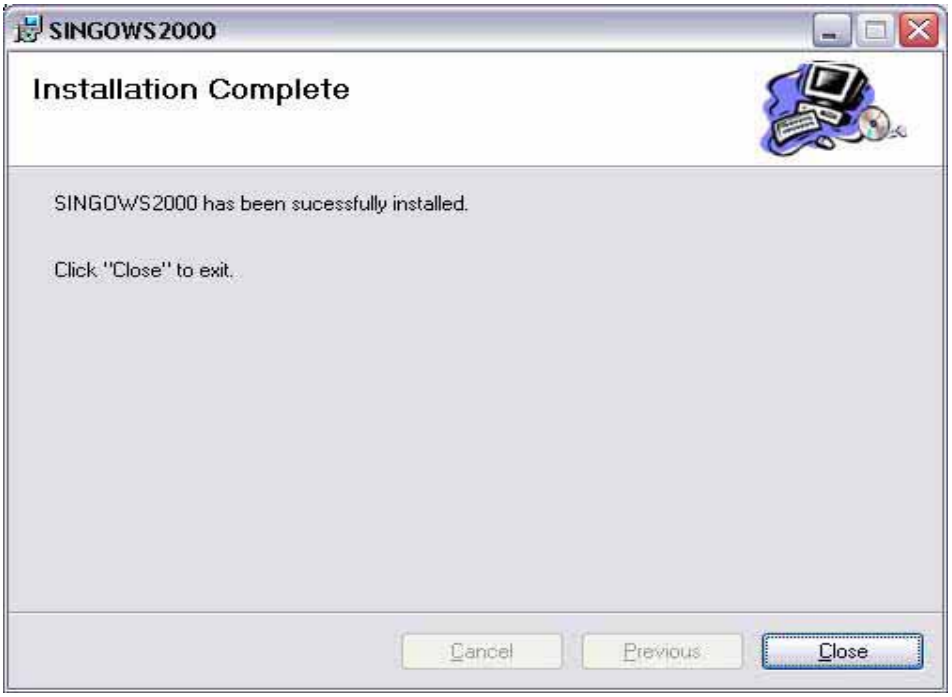
The confirm Installation dialog box appears.
Click the next button.



The Installing software dialog box appears.

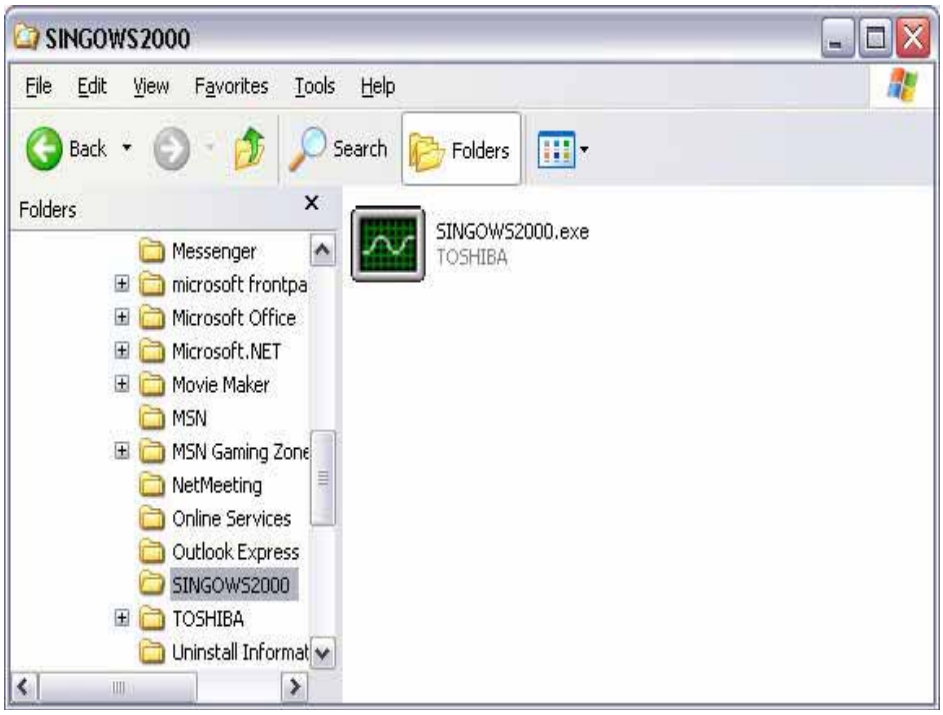


The Installation Complete dialog box appears.
Click the close button.

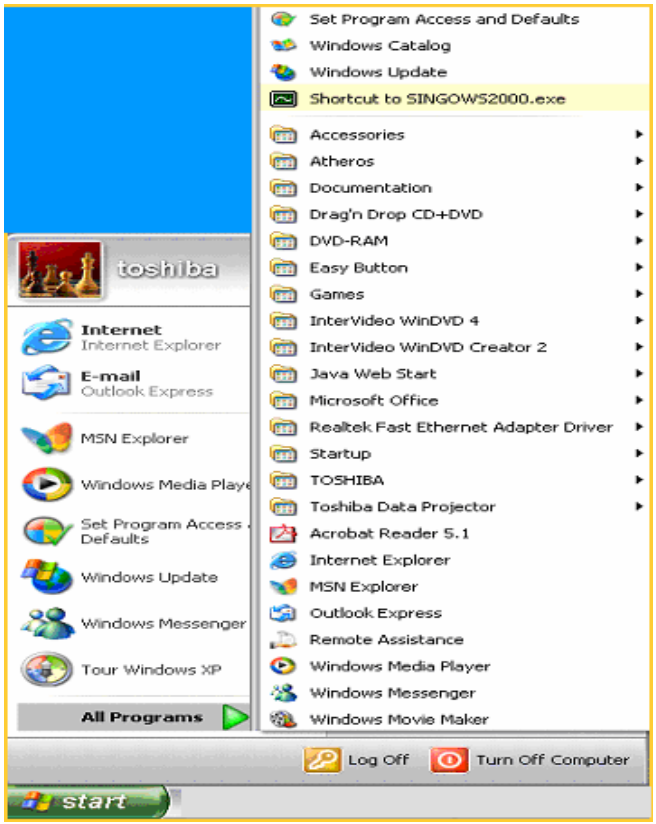


Startup the Software

Open Windows Exploler, navigate to the location where you stored the files, Then double click the **SINGOWS2000.EXE**.



Moreover, even if it chooses the shortcut of the All programs of start, it can startup.

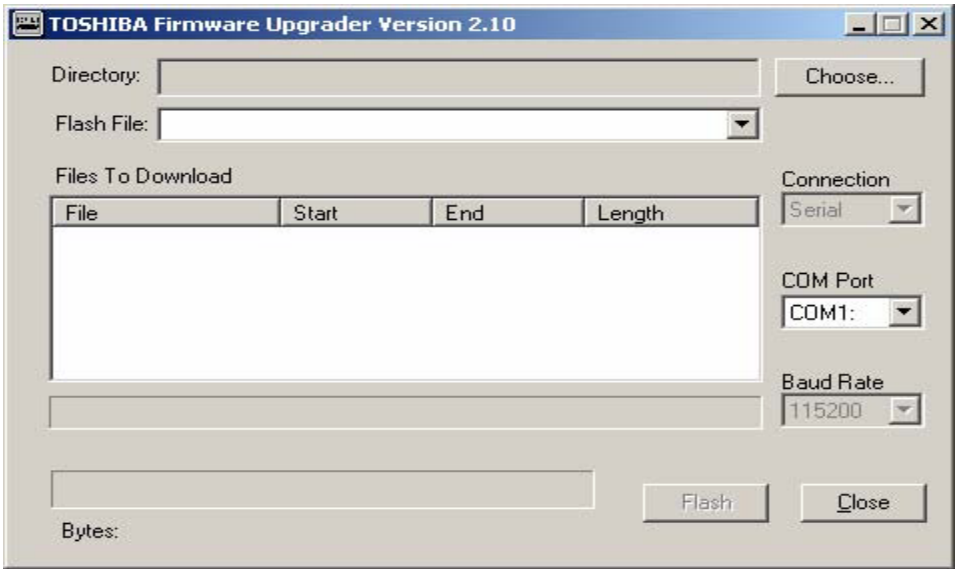


Firmware Upgrade

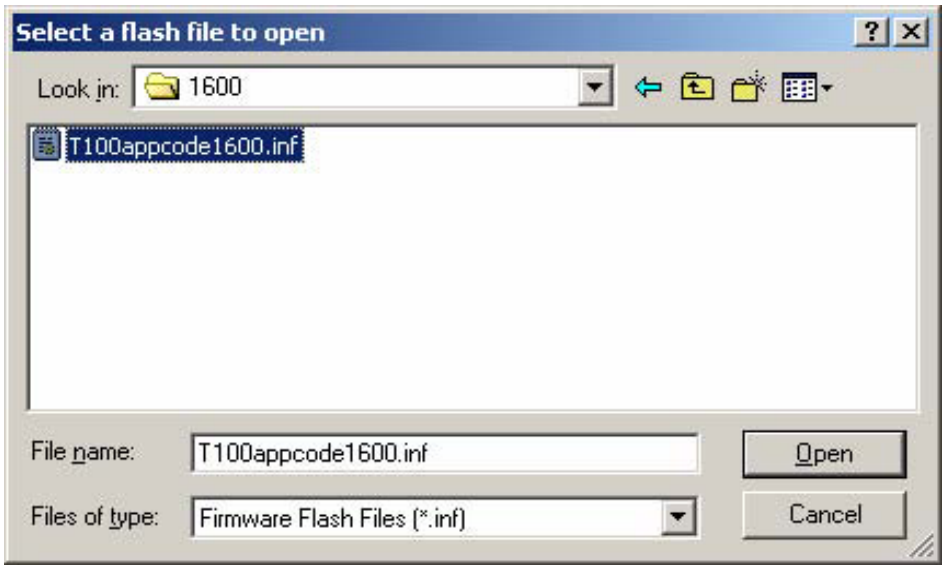
Upgrade the software

Connect the control cable to the control terminal on the projector.
Then plug the RS232C connector on the other end of the cable into a RS232C port on the computer.
Open Windows Explorer navigate to the location where you stored the upgrade files, and then double click the **Firmware Upgrader.exe**.

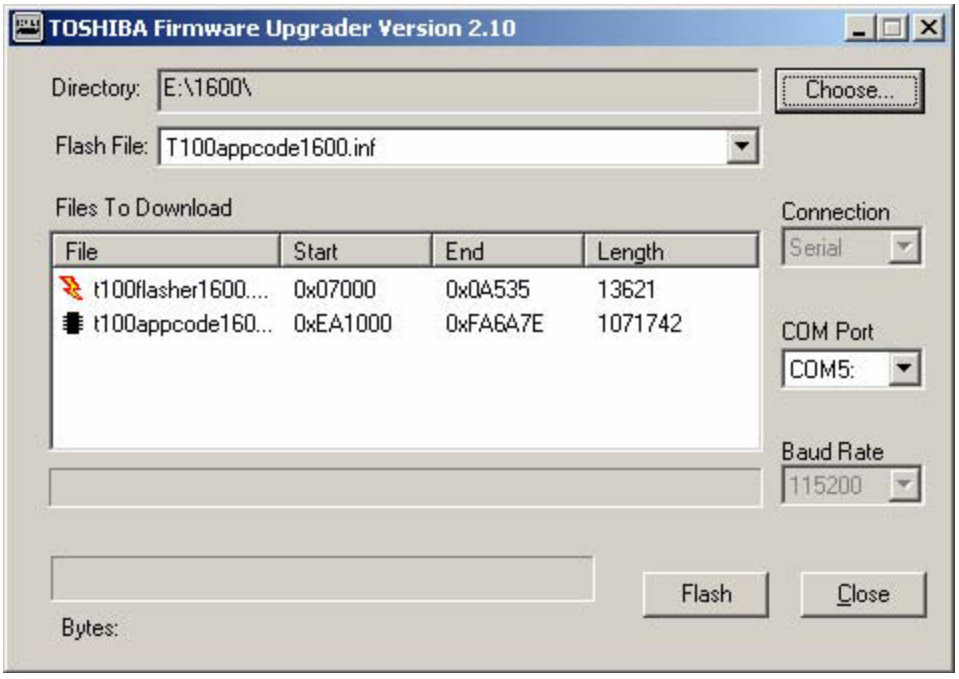
The Upgrade Wizard appears. Click the **Choose** button to open the Select File Dialog box.



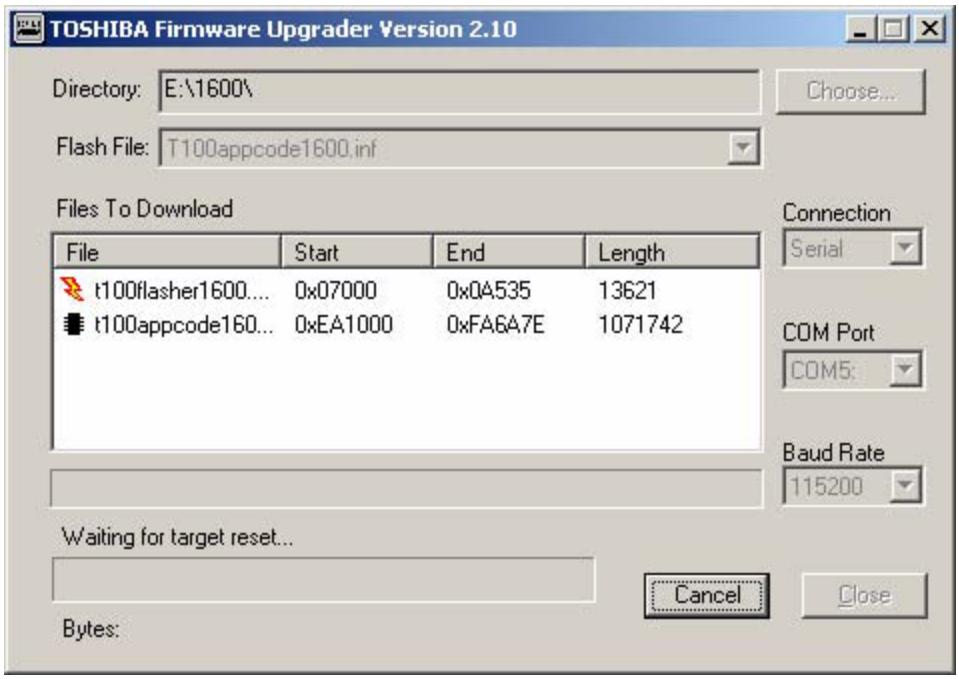
In the Open File dialog box, select the **.inf** file, and then click **Open** button.



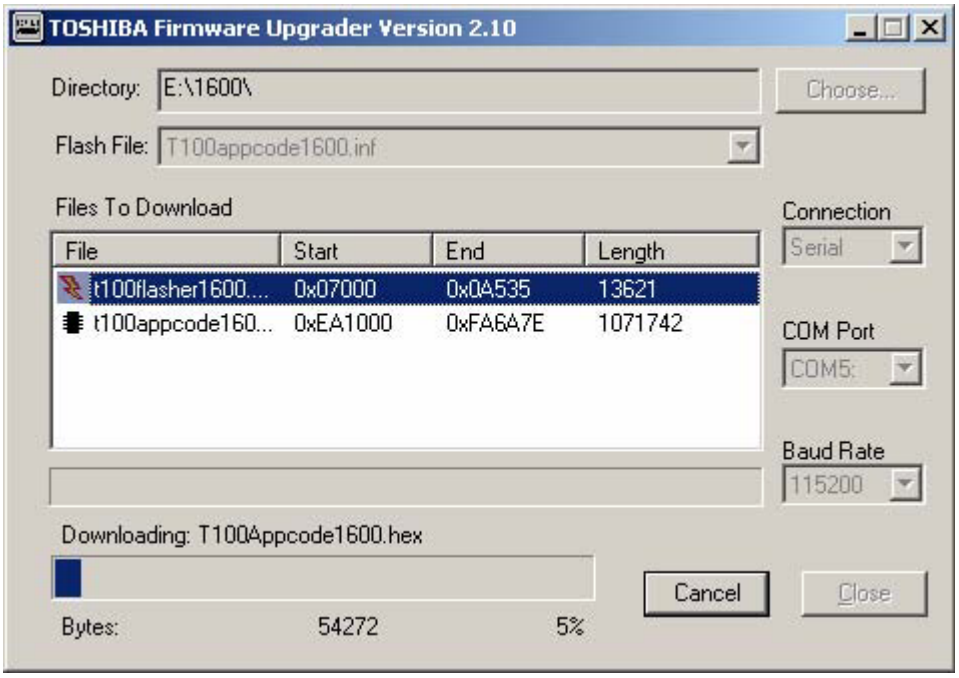
The upgrade file appears in the Select File box.
Select the COM port.



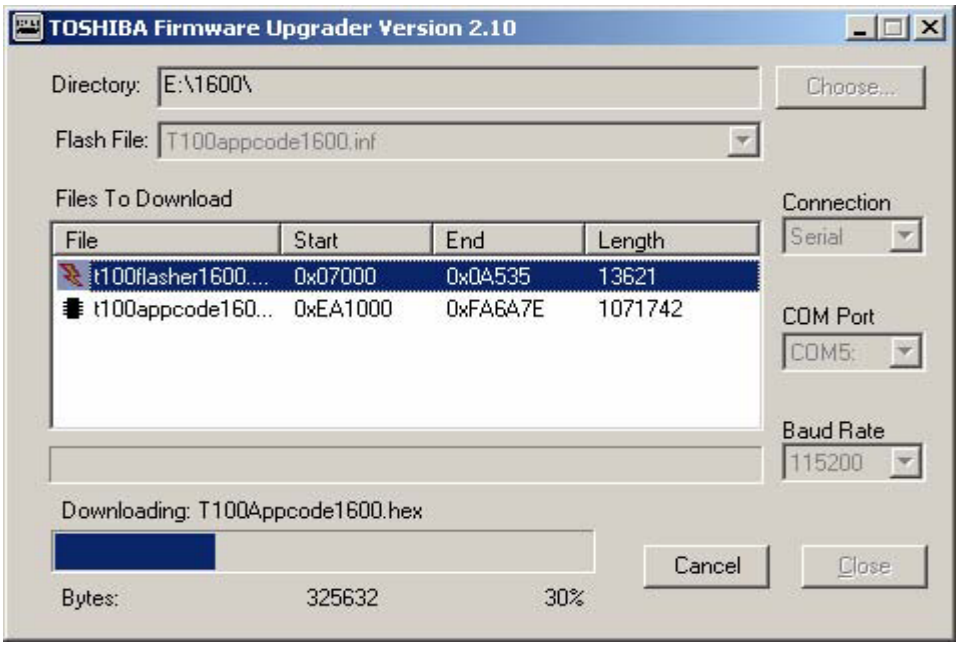
Click **Flash** button.



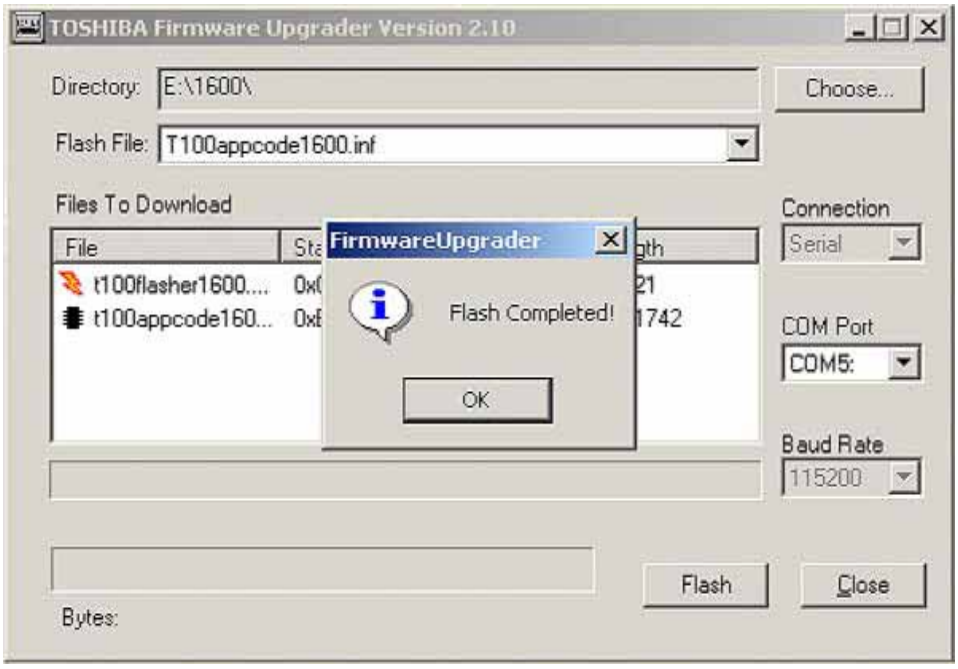
Press and hold the projector's **[Input]** and **[Keystone]** keys, and then plug in the power cord.
The projector starts the Firmware upgrade, **[LAMP]**, **[TEMP]** and **[FAN]** LED's are Green blinking after Orange blinking.



The computer begins downloading the upgrade files to the projector.
The process may take several minutes.



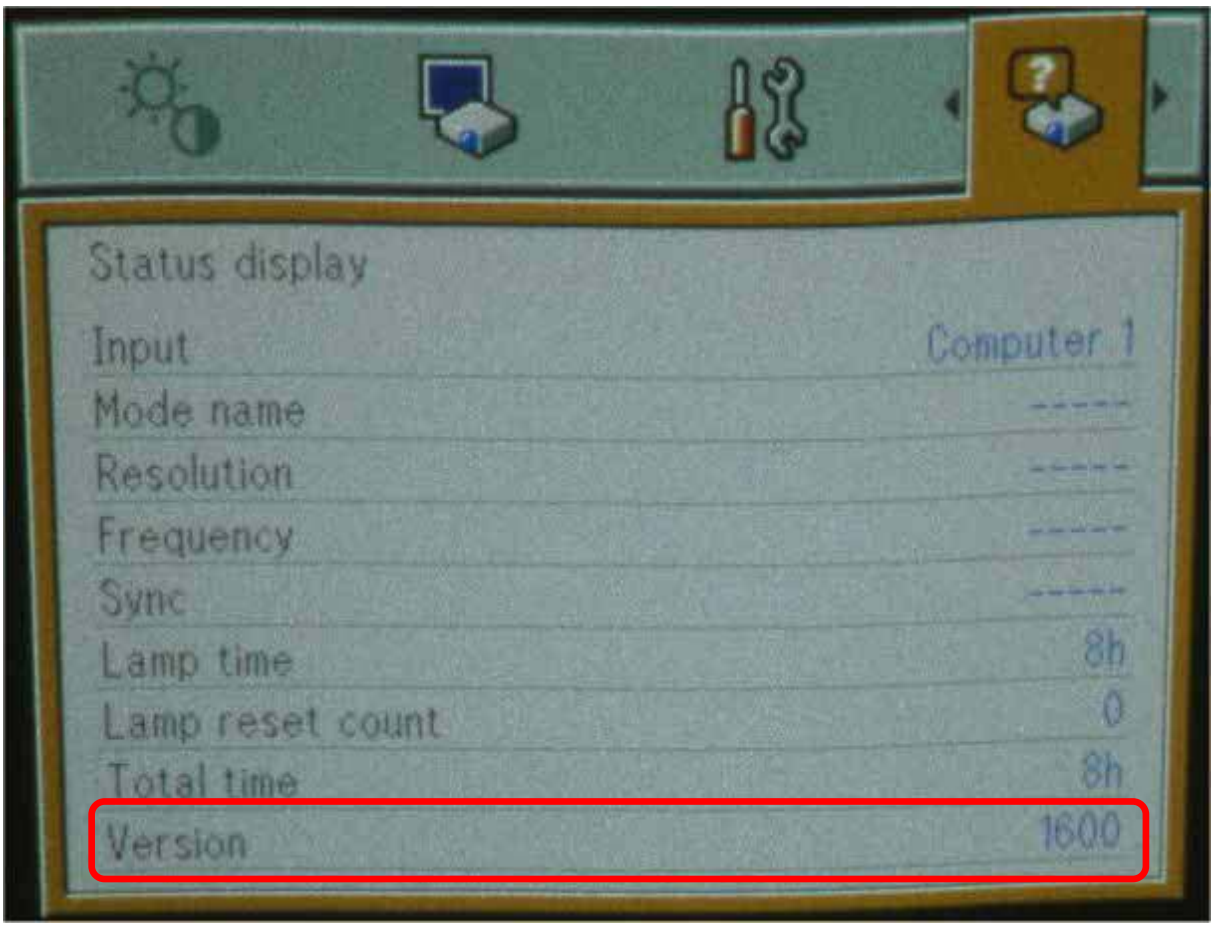
When the upgrade finishes normally, the following dialog box appears.



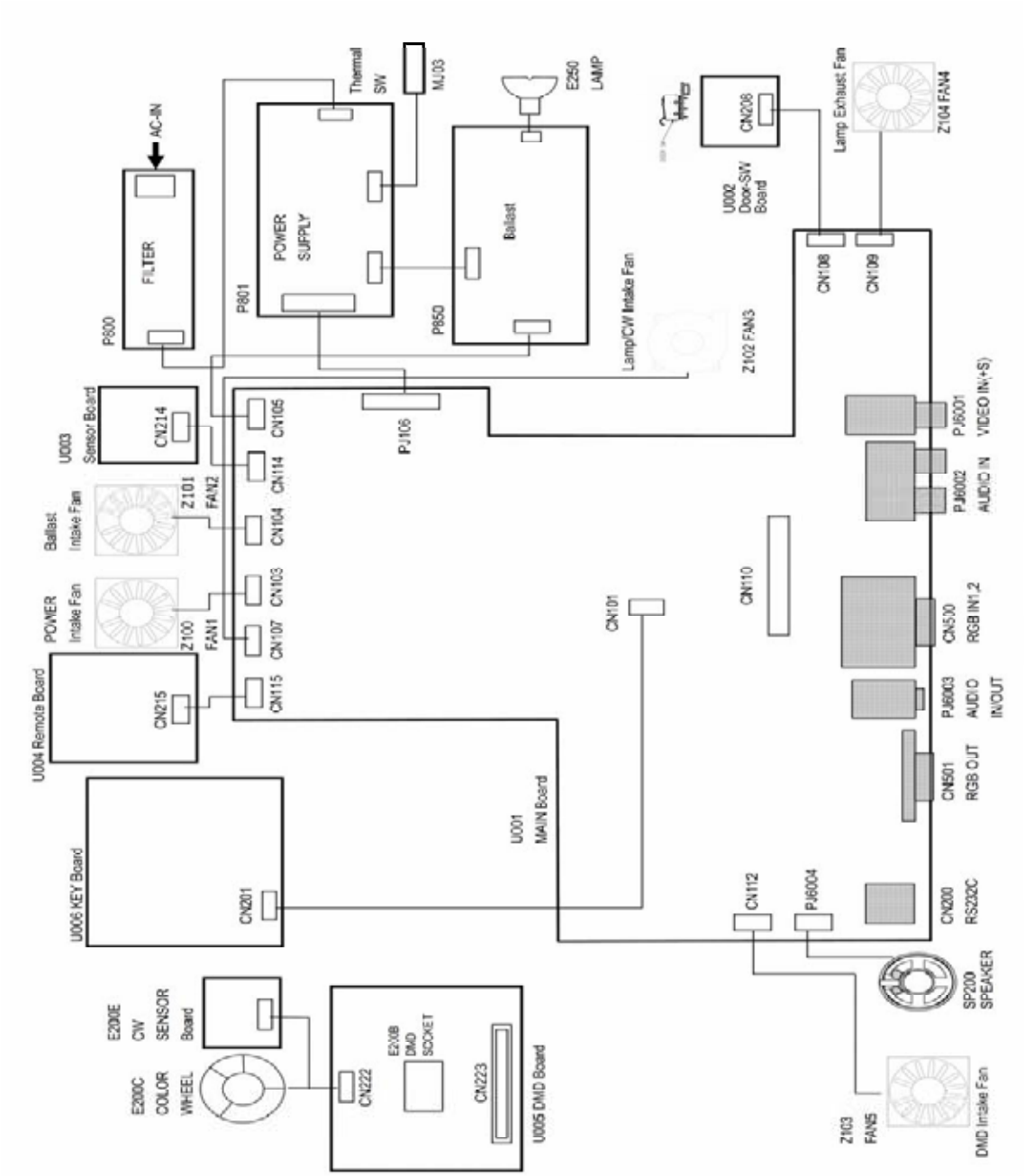
Click the **Close** button.
The upgrade is complete.

Confirm the software upgrade

1. Power up the projector.
2. On the projector keypad, press the MENU key to display the menus.
3. Press button Right or Left arrow to highlight Setting display.
4. The Setting display dialog box display the software version.
   These should match the upgrade version you downloaded.

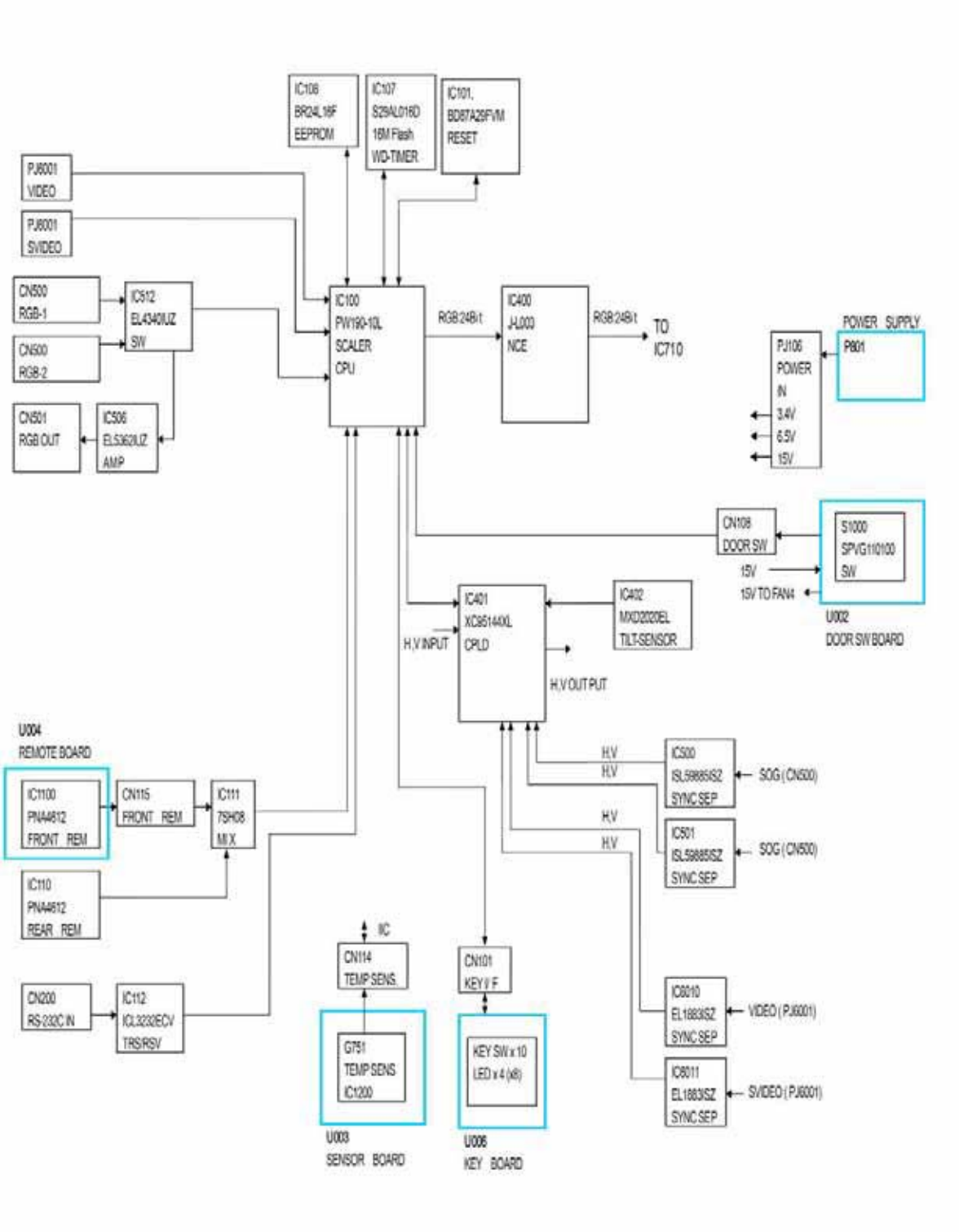


Wiring Diagram

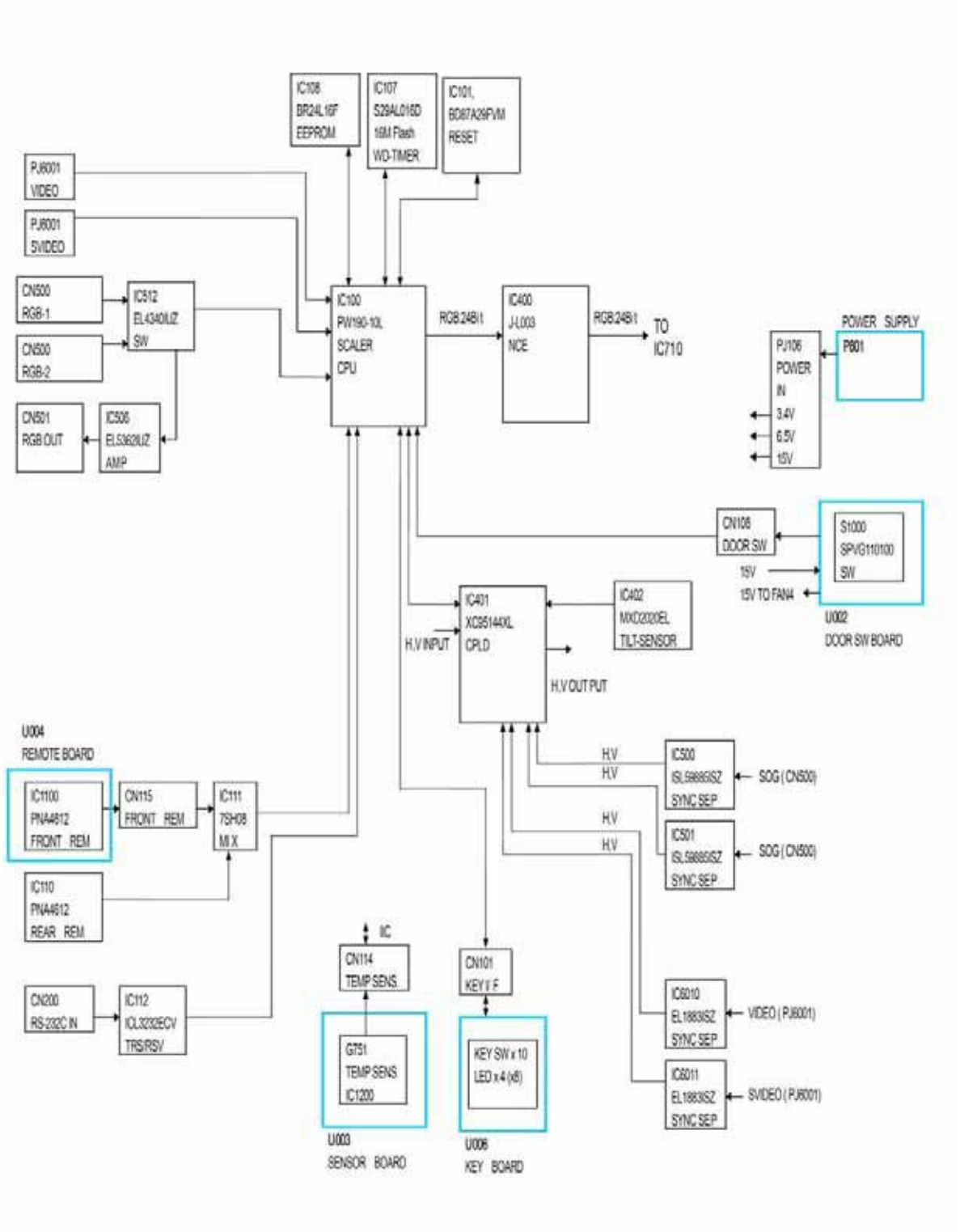


Block Diagram

Block Diagram 1/2



Block Diagram 2/2



LED Display

LED Display (Problems Shown on LED Indicator Combination)

Error Code No.	Status of Indicator Lights	Trouble and Cause	Solution
-	L T F O	**[Standby power is not on]** -> There's a problem with the power supply or the MAIN Board.	Check the power supply. Check the connector. Check the MAIN Board.
1	L T F O	**[Lamp error]** Lamp went out during use,or won't come on. -> Lamp temperature is high or the lifetime of the lamp has ended or the projector is malfunctioning.	Unplug the power cord and wait for a short while, then turn the power back on. If the lamp burns out, replace it with a new one. Or it may have a trouble at ballast power supply. Or it may have a trouble at color wheel sensor or color wheel ribbon cable or MAIN Board.
2	L (ORANGE flashing) T F O	**[Lamp cover error]** Power went out during use, or power won't come on. -> The lamp cover is not properly attached.	Unplug the power cord and reattach the lamp cover.
4	L T F O	**[Fan error]** Power went out during use. -> Problem with internal cooling fan or IC360(M62334), IC352(G794) and IC351(G760AF) don't reply to I2C commands or the MAIN Board does not read revolving pulse. Error code 04:Power Intake Fan 05:Ballast Intake Fan 06:Lamp/CW Intake Fan 07:Lamp Exhaust Fan 08:DMD Intake Fan	Check the each cooling Fan. Check the MAIN Board.
5	L T F O		
6	L T F (RED flashing) O		
7	L T F (ORANGE flashing) O		
8	L T F O		
9	L T F O	**[Temperature error]** Power went out during use. -> Internal overheating, or the outside temperature is too high or temperature sensor doesn't reply to I2C commands. Error code 09:Intake temperature sensor (Sensor Board) 10:Lamp nearby temperature sensor (MAIN Board)	Place the projector so that the air intake and exhaust are not blocked. Unplug the power cord and wait for a short while, then turn the power back on. Check the each temperature sensor.
10	L T F O		
13	L T F (GREEN flashing) O	**[Device error]** Power went out during use. -> There are problems with the MAIN Board. Error code 12:NJM1141, BR24L16, DDP2000 at MAIN Board.	Check the MAIN Board.

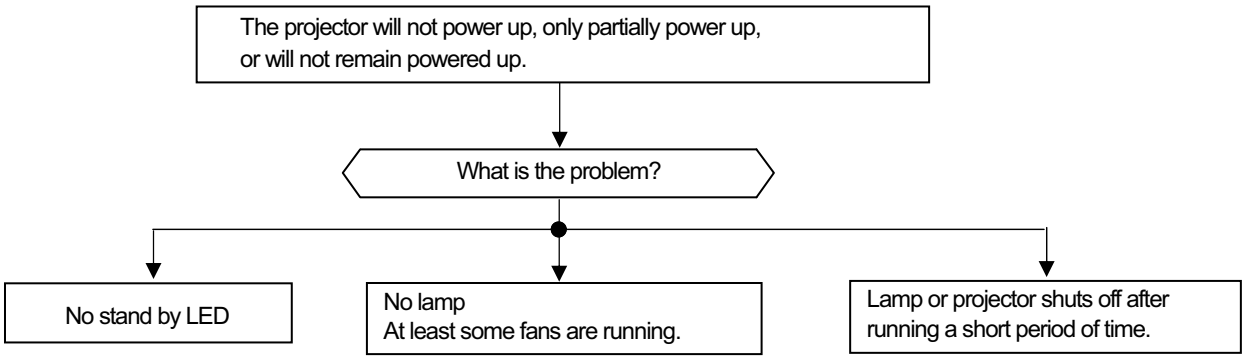
Notes
When each error occurs,after approx.one minute of abnormal display, the projector turns to the standby state waiting for internal cool down. [L] : LAMP, [T] : TEMP, [F] : FAN, [O] : ON

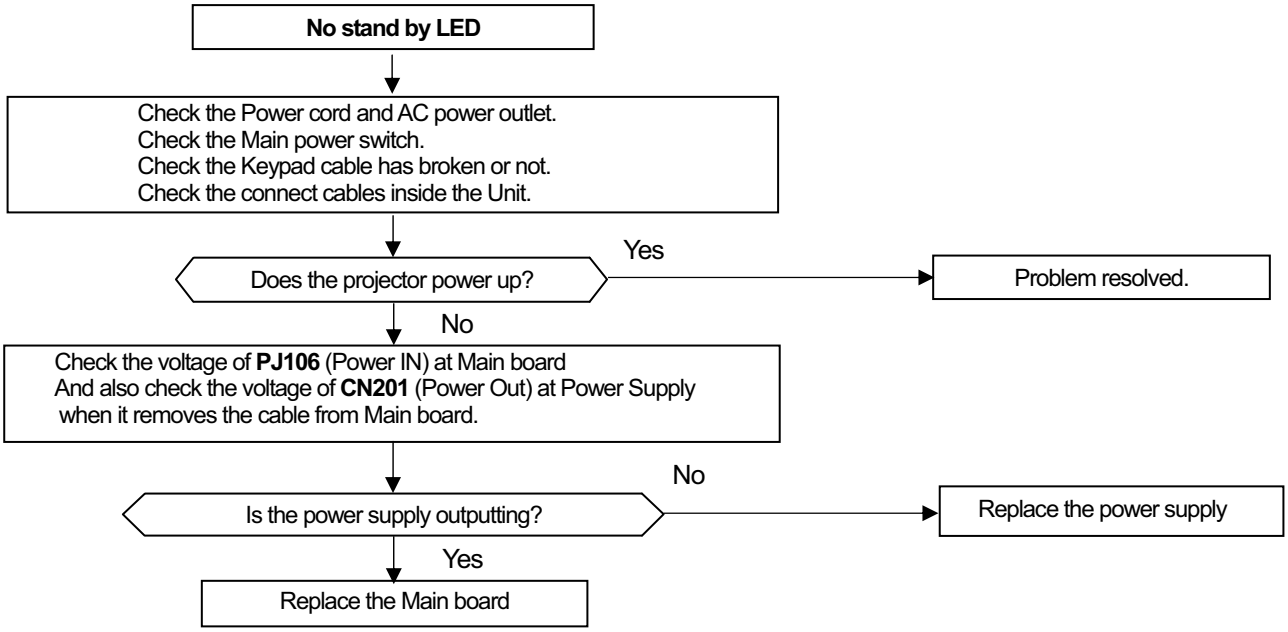
Troubleshooting

You use this section to diagnose problems with the projector. Choose the problem you are trying to diagnose from the list below. The Power, Image and Audio sections provide a variety of symptoms, while the other includes only one page.

1. For Power problems
2. For Image problems
3. For Audio problems
4. For Remote Control
5. For Keypad problems
6. For Menu problems

Troubleshooting Power Problems





No lamp

Check the error code log at service mode
When there is the error code, refer to the LED error List.
When the error code is Lamp error (No.1), remove the lamp to see if it looks good.
There should be no ruptures, no bulges, and no cracks in the reflector.
Substitute a known good lamp if you want to be absolutely certain that the lamp is not the problem.
Replace the lamp.

Check the color wheel motor cable and color wheel sensor cable are connected to the Main board.

Does lamp enable measure low?
(CN105 3PIN)

Yes

370V (DC): CN102 1PIN (RED)
(POWER SUPPLY SIDE)

No

Is 370V (DC) input
of Ballast OK?

No

Yes

Replace the ballast

Are DC power voltage levels
OK on the Main board

No

Replace the power supply

Yes

Replace the Main board

Lamp or projector shuts off after running a Short period of time.

Note:
This is usually a thermal issue caused by excessively high internal temperature.
The high temperature could cause a component on the Main board or the power supply to fail when it gets hot.

Check the error code log at service mode
When there is the error code, refer to the LED error List.

Are all fans running?

Yes

Replace the Main Board

No

Replace the broken fan.

Does the projector run property?

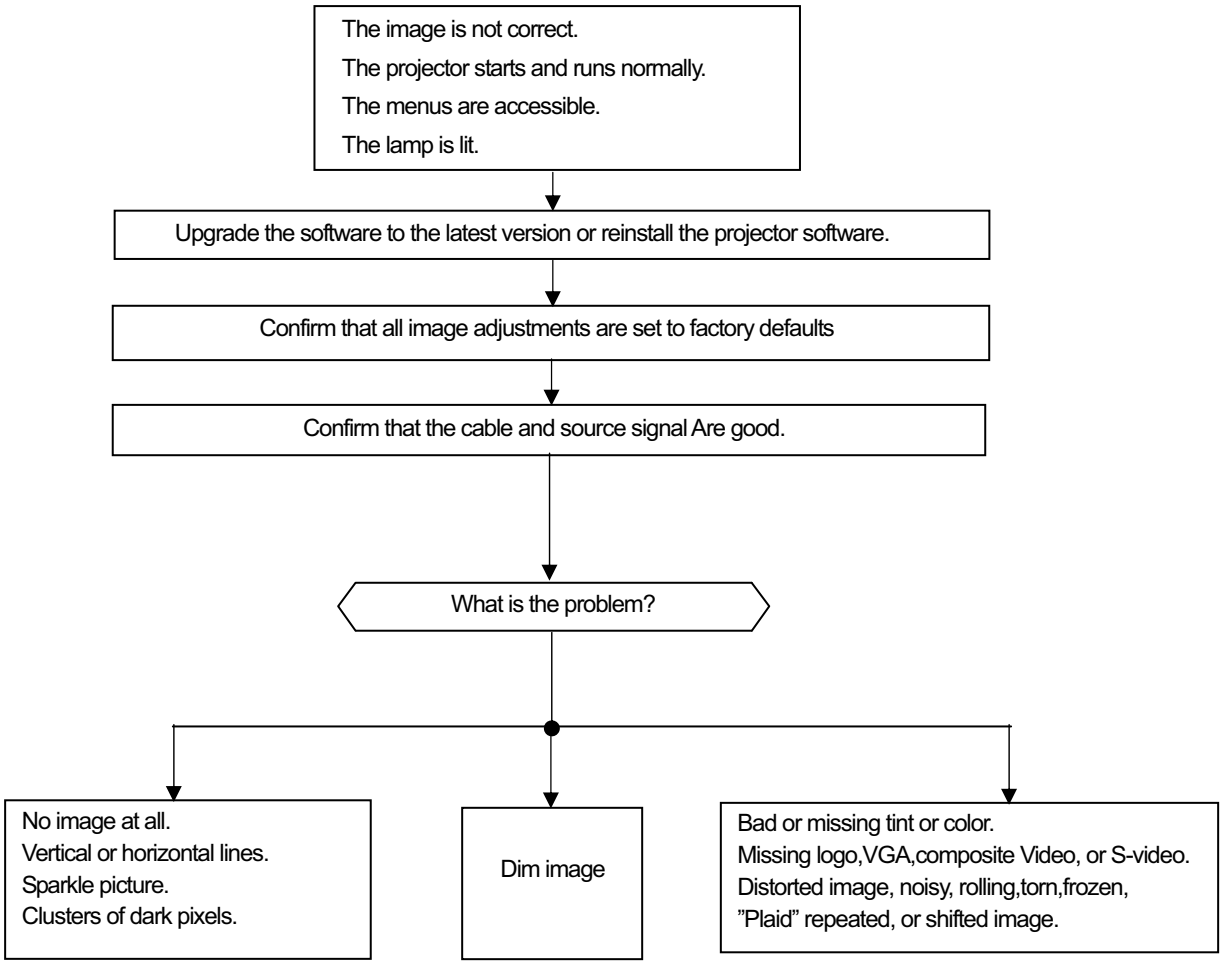
Yes

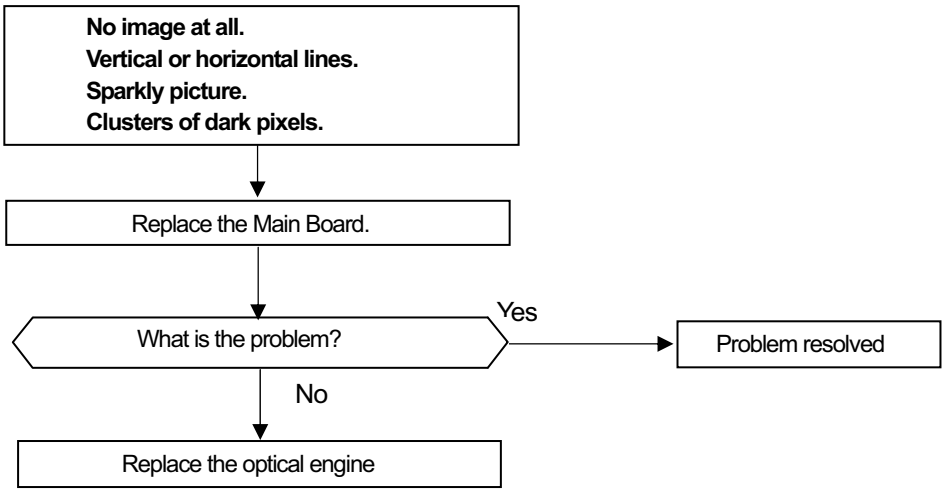
Problem resolved

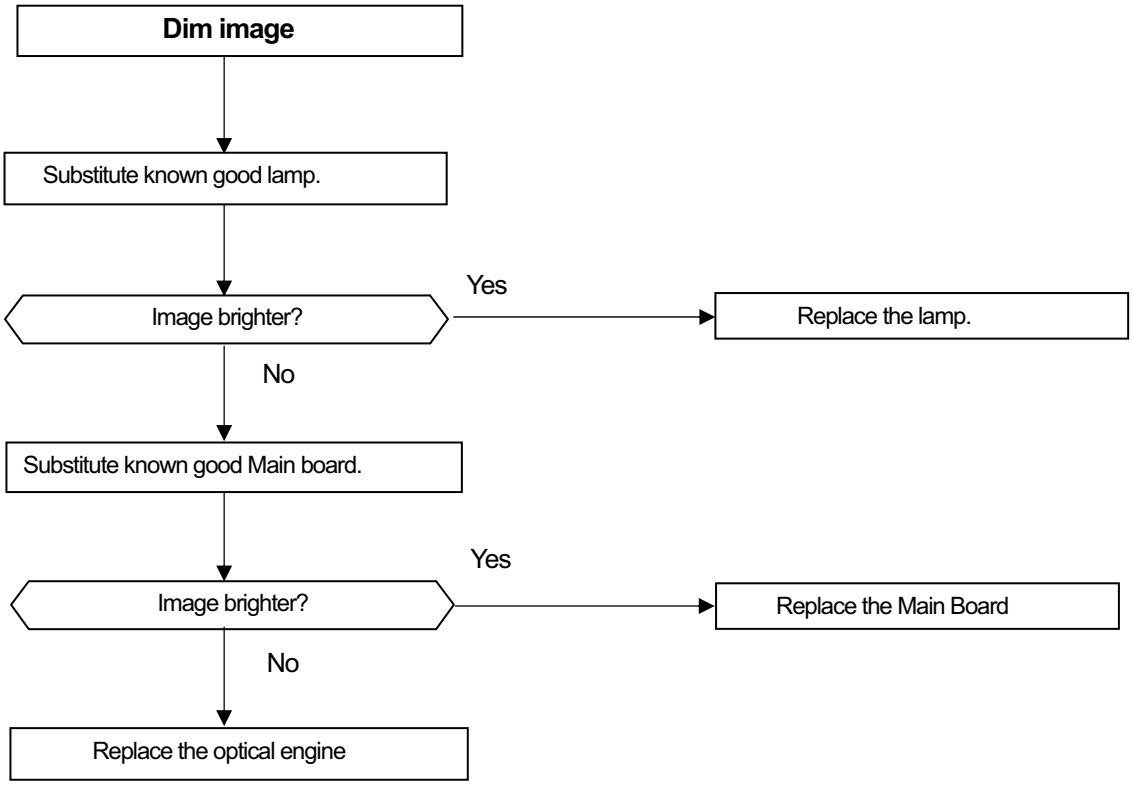
No

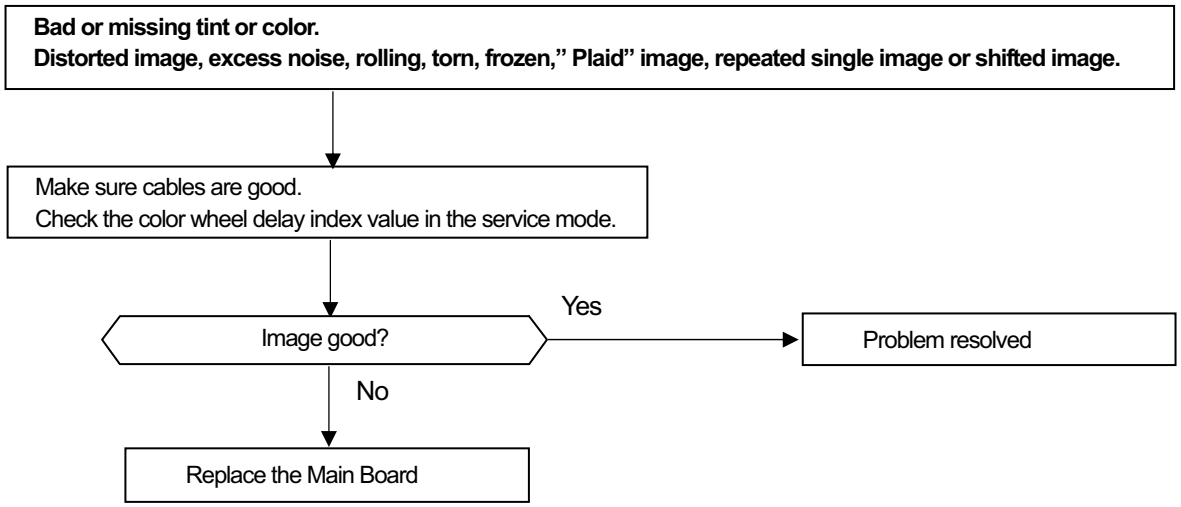
Replace the power supply

Troubleshooting Image Problems

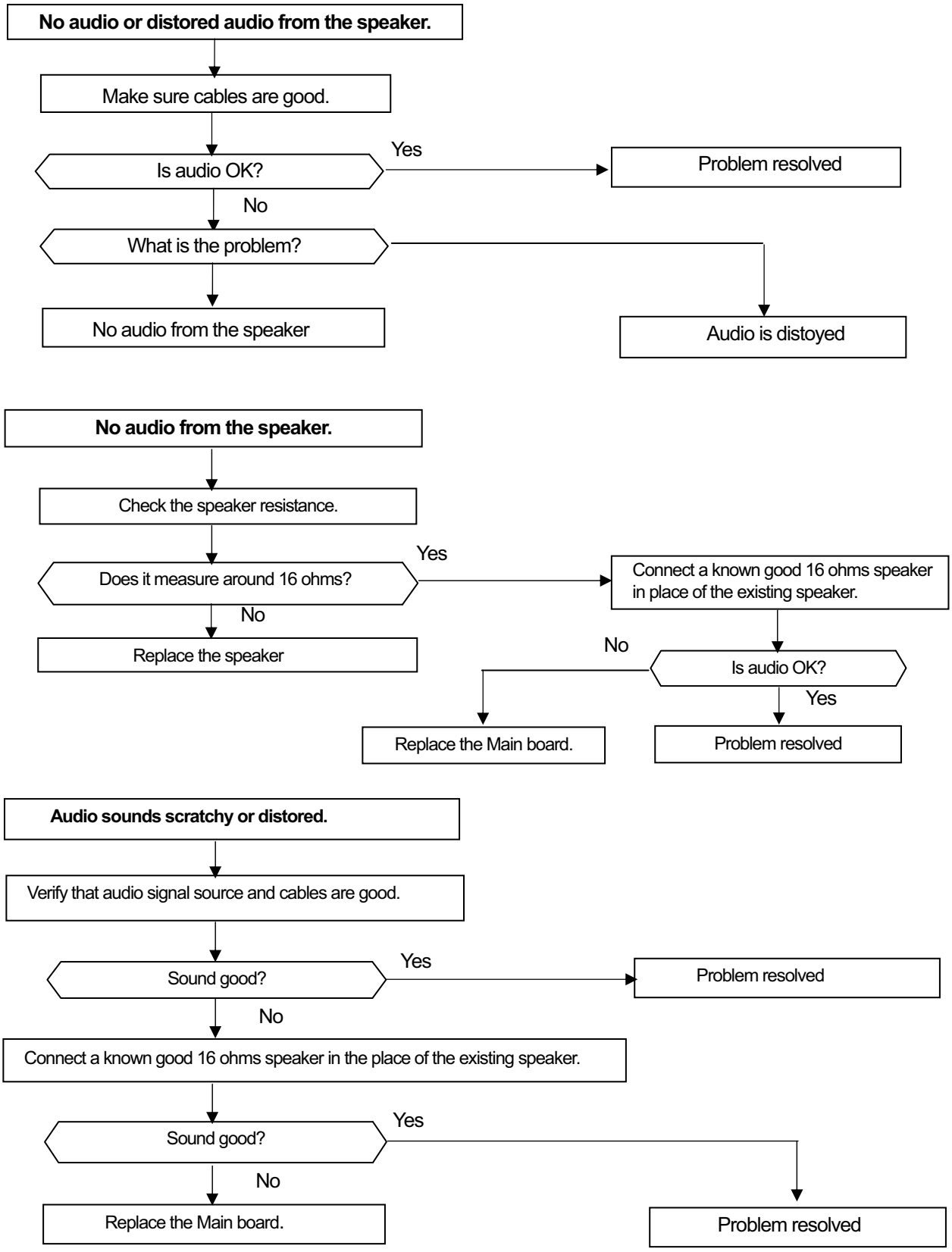




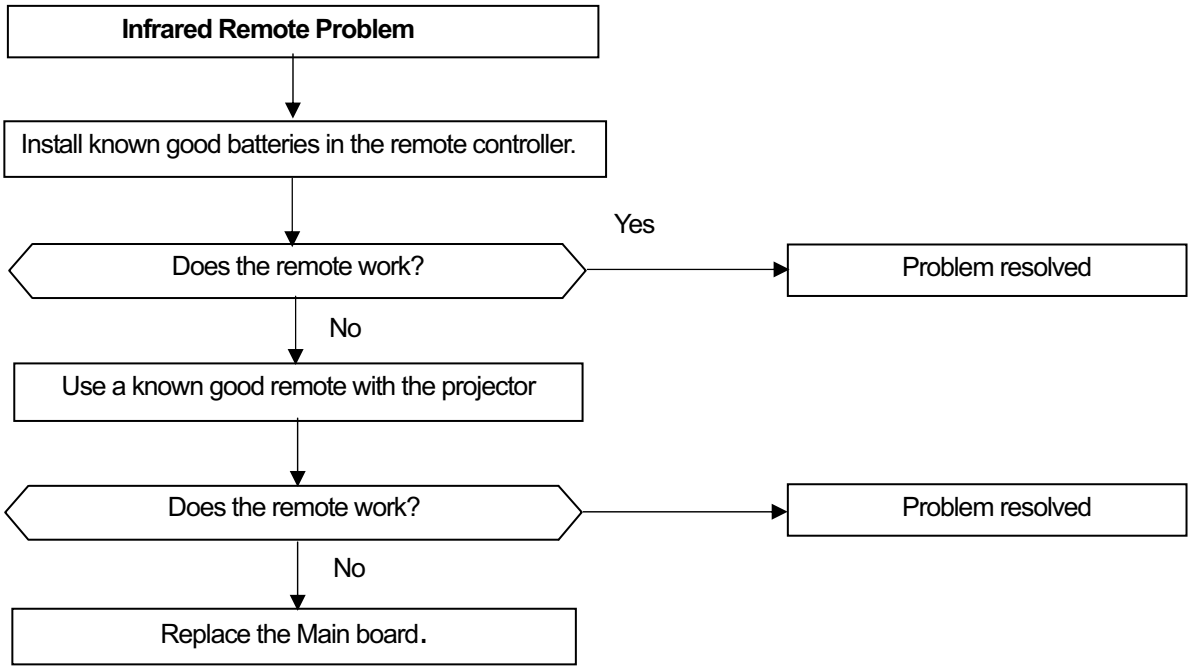

Dim image
Substitute known good lamp.
Image brighter?
Yes
Replace the lamp.
No
Substitute known good Main board.
Image brighter?
Yes
Replace the Main Board
No
Replace the optical engine


Bad or missing tint or color.
Distorted image, excess noise, rolling, torn, frozen," Plaid" image, repeated single image or shifted image.
Make sure cables are good.
Check the color wheel delay index value in the service mode.
Image good?
Yes
Problem resolved
No
Replace the Main Board

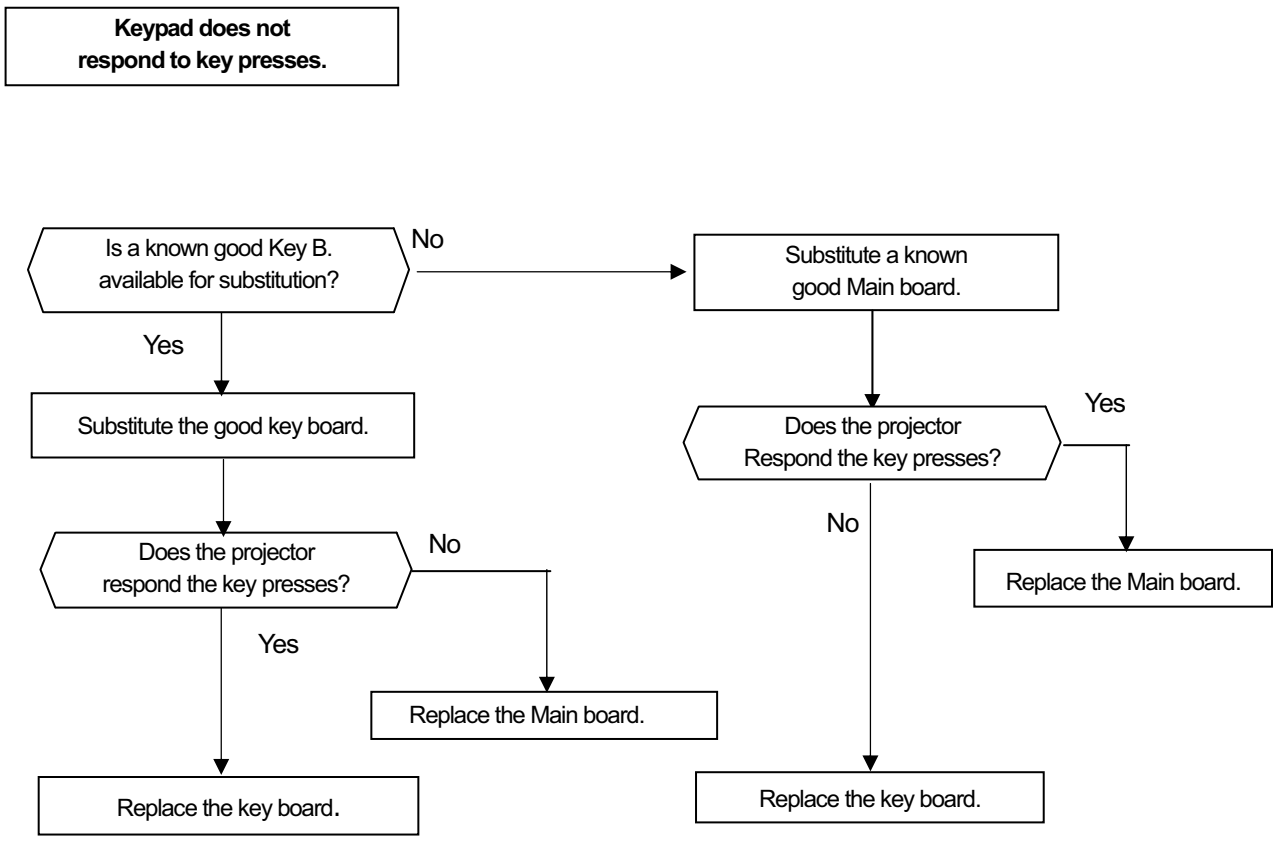
Troubleshooting Audio Problems



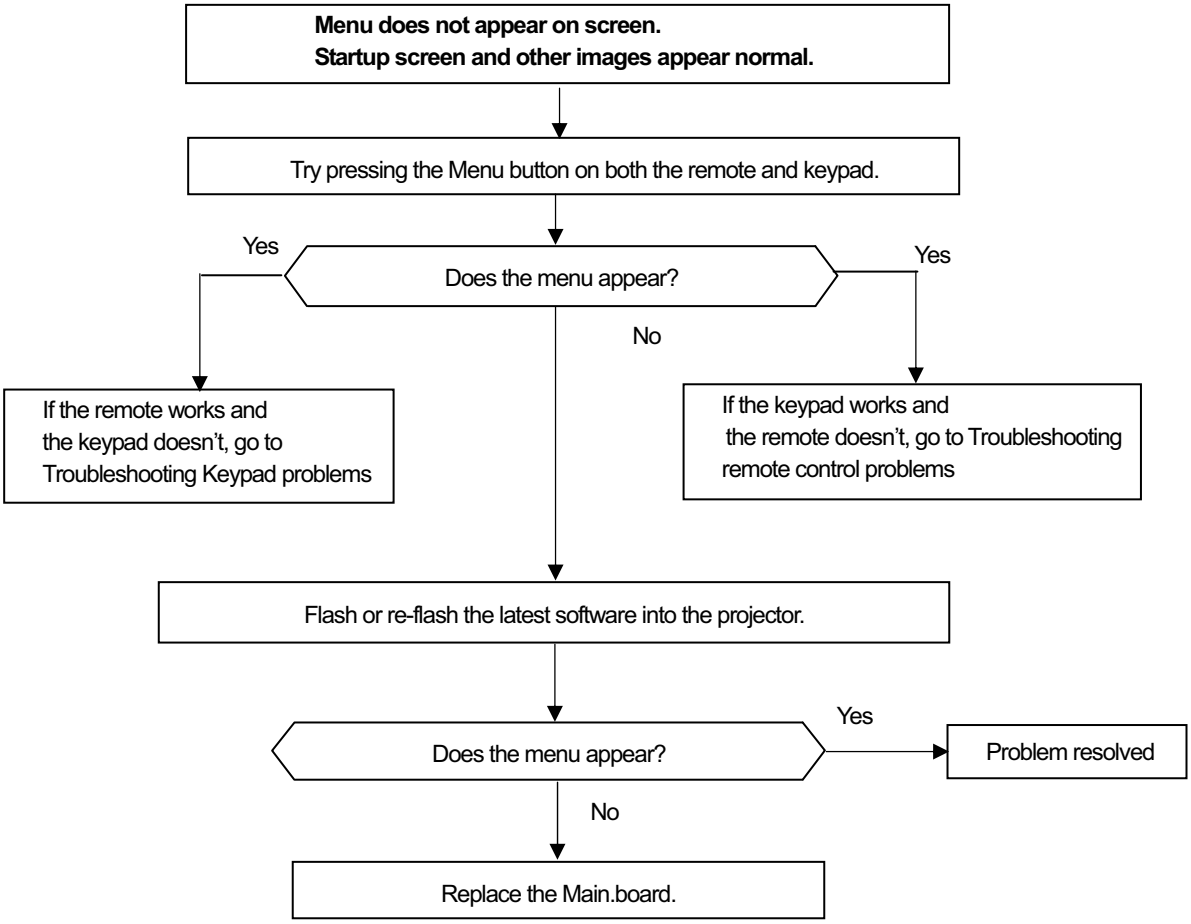
Troubleshooting Remote Controller Problems



Troubleshooting Keypad Problems



Troubleshooting Menu Problems



Operation of Power Supply (APS-M602)

The APS-M602 power supply circuit shown as (Fig.1)

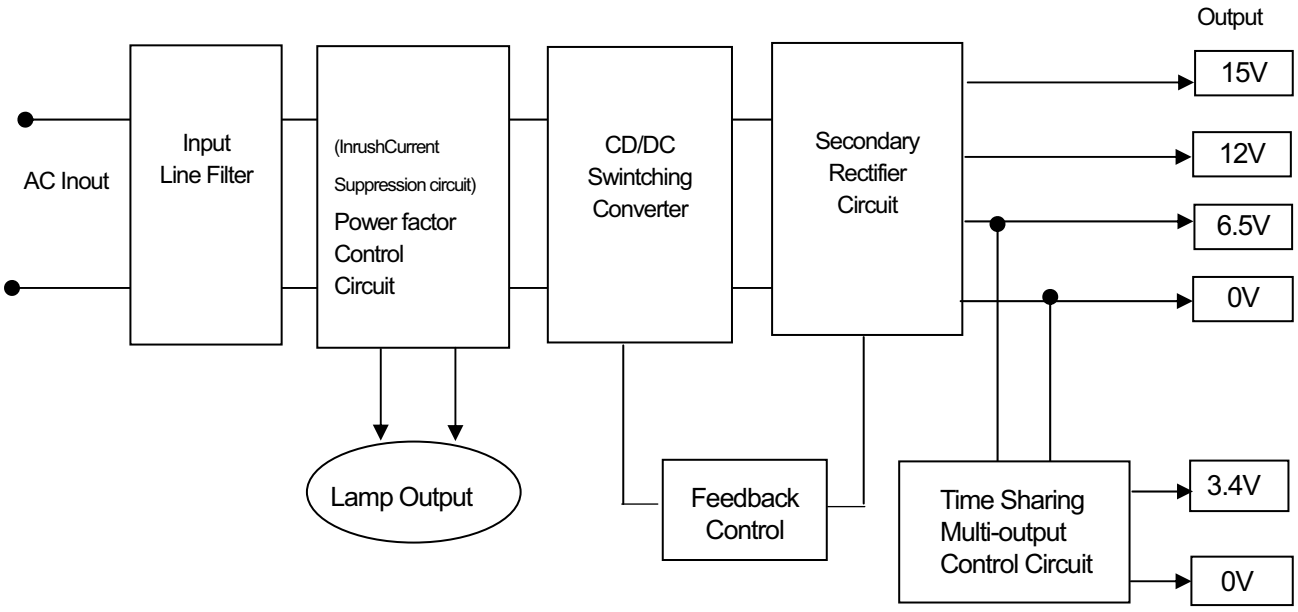


Fig.1

1)Input Line Filter

A switching power supply generates a lot of electromagnetic noise. The function of the AC line Filter, witch is made up of capacitors (e.g.C103) and inductor choke (e.g.101,L102),is to attenuate these noise so that other equipments many not be affected.

The surge absorber Z101 which absorbs high voltage surge from the input lines. These are mounted on the input filter.

*The fuse (F101) becomes open in order to protect other parts, when excessive current flows at abnormal conditions.

*CN101 is connected thermo sensing element (e.g. Thermal protector.)
Power Supply is operated by CN104 shorted condition.

2) Power Factor Control Circuit

This circuit has 5 functions as below.

A) To generate stable voltage
B) To reduce input harmonic currents
C) Over current protection
D) Over voltage protection
E) (Inrush current suppression circuit)

A) Generate stable voltage

This circuit operate as step up to 370Vdc(type.)and voltage control.Actually,Q1,Q2(MC102) are switched by MC101.
Initial voltage setting of 370V output(between pin 1 and pin 3 of CN102)has set at 370V(type.) by VR101.(Input voltage :100Vac,max.load)

B) Reduce input harmonic current

Normally switching power supply circuit is capacitor input type. Input current of this power supply has many harmonics, because of the conduction angle of input current is narrow.
Therefore, an input current is distorted and this is a cause of low power factor.
Main purpose of Power Factor Correction Control Circuit is reducing input harmonic current. MC101 senses input voltage(through R102 to pin13 of MC101),then compare the sine waveform and control Q1,Q2(MC102) switching as correct sine waveform.

C) Over current protection

The peak current through Q1,Q2 (MC102) is detected at pin 9 of MC101 as the voltage across R110, R162.
When the drain current of Q1,Q2 (MC102) goes over a certain limit, control ON-duty of them, and MC101 turns off.

D) Over voltage protection

Lamp output voltage is adjusted at 1 pin of MC101 voltage by VR101.Even if this Connection to be open,it must be protected. So we prepared other circuit for over voltage protection. Lamp voltage is detected at pin 2 of MC101,when lamp voltage to be abnornal,pin 4 of MC101 to be pulled down, Q107 to be turn on, pin 8 of IC101 to be pulled up, and power supply to be shut down.

E) (Inrush current suppression circuit)

Not related by PFC,but include inrush current suppression circuit.
This circuit is to reduce (big) charge current through CNl102 lamp drive(Ballast)power supply and Charge current C116,at AC input timing.
This circuit composed of C109, CR101, TH101, CR101 and C, R.

3) Switching Converter

The main parts of switching converter are transformerT101, switching MOS FET Q3 (MC102) and output diode D201, D203.This converter is Fly Back type.
This means that energy is transferred from the primary to secondary when Q3 (MC102) is off.
The main output is 6.5V output and auxiliary output is 15V output.

4) Control Circuit

a) Start up

When AC input is ON, power source of IC101 is supplied from R135~R138 and start switching and then the converter is Starts. Once the converter begins switching, power source of IC101 is supplied from B2-B1 winding of T101.

b) Output Voltage Control

Output voltage is controlled by pulse Width Modulation (PWM).
6.5V output voltage is sensed at between R213 and R214; it is compared against the reference voltage of IC20l.Optoisolator PC101 feeds back the comparison from secondary to primary by adjust The level of current drawn from pin 2 of IC101.
When6.5V output voltage is above the control level,IC101 to shorten the on-time (duty cycle) of Q3 (MC102).This cause the average output to decrease. When the output is below the control level, on-time (duty cycle) is increase, thereby increasing the average output voltage.

c) Over Current Limit

The peak current through Q3(MClO2) is detected at pin 3 and pin 4 of IC101 as the voltage across R131 and R132.
When the drain current of Q3 (MC102) goes over a certain limit, ICl101 turns off Q3 (MClO2).

d) Over Voltage Limit

Output voltage is detected by winding voltage of Bl-82 (T101).This voltage is same as Vcc of IC101 (pin6).If output voltage becomes over voltage condition, pin 8 of IC101 to be pulled up through zener diode ZD102,then power supply is shut down.

e) Over Heat Protection

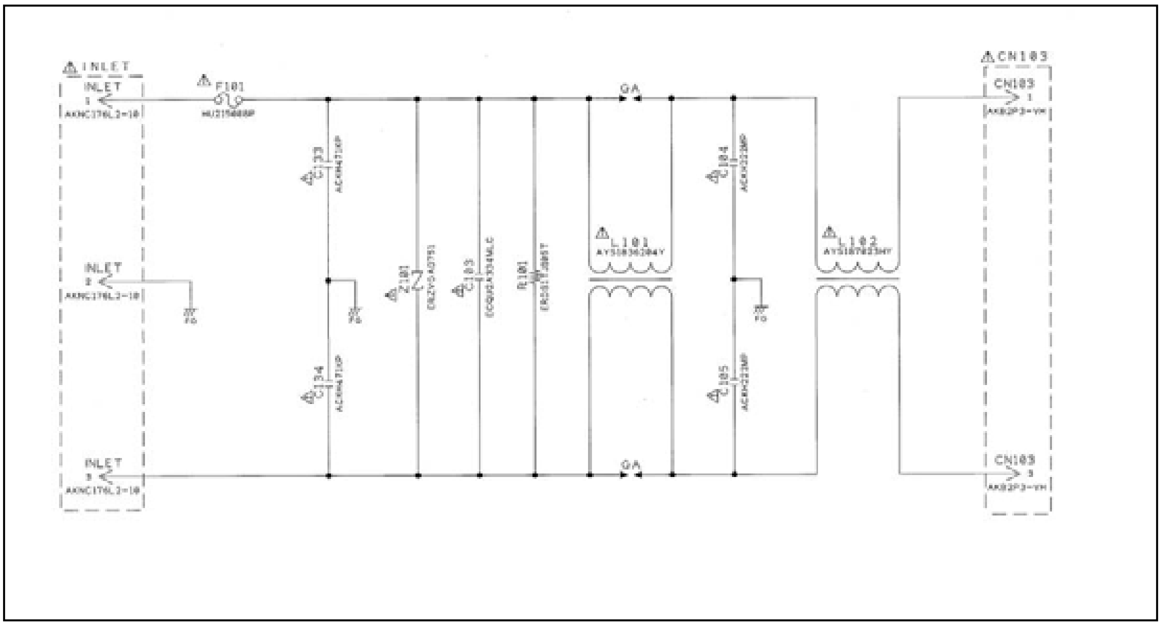
Over heat protection is detected Soldering parts temperature of Ql,Q2(MC102) by TH102 and temperature of winding of T101 by thermo-fuse.
At abnormal condition (ex. Over-load or fan-lock) when over temperature from setting temperature, power supply shall be shut downed.
The thermo-fuse becomes open in order to protect other parts.

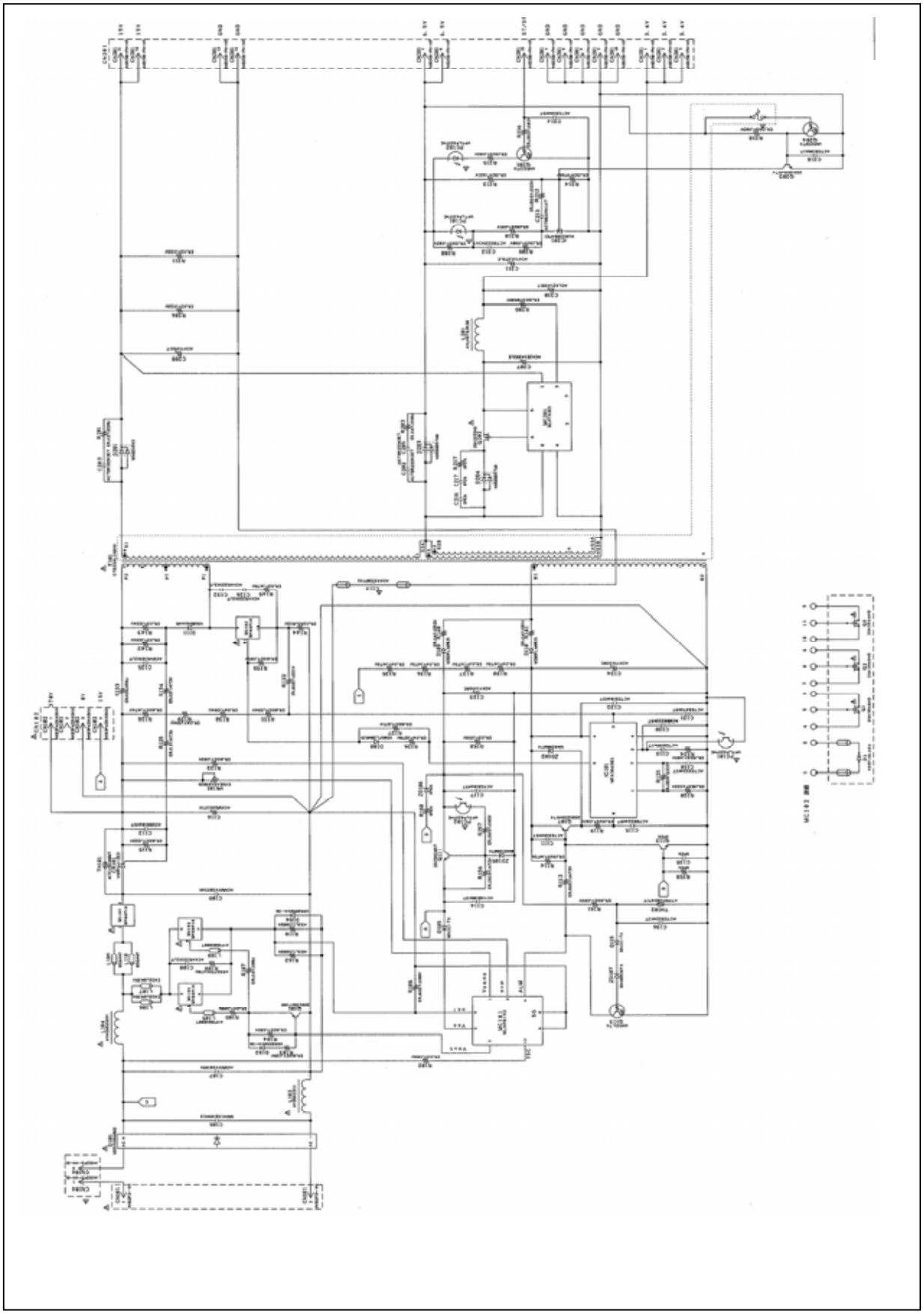
5) Secondary rectifier circuit

The cathode voltage of D203 is pulsating.D203 and C211, which smooth out the pulsation to give a low ripple DC output.

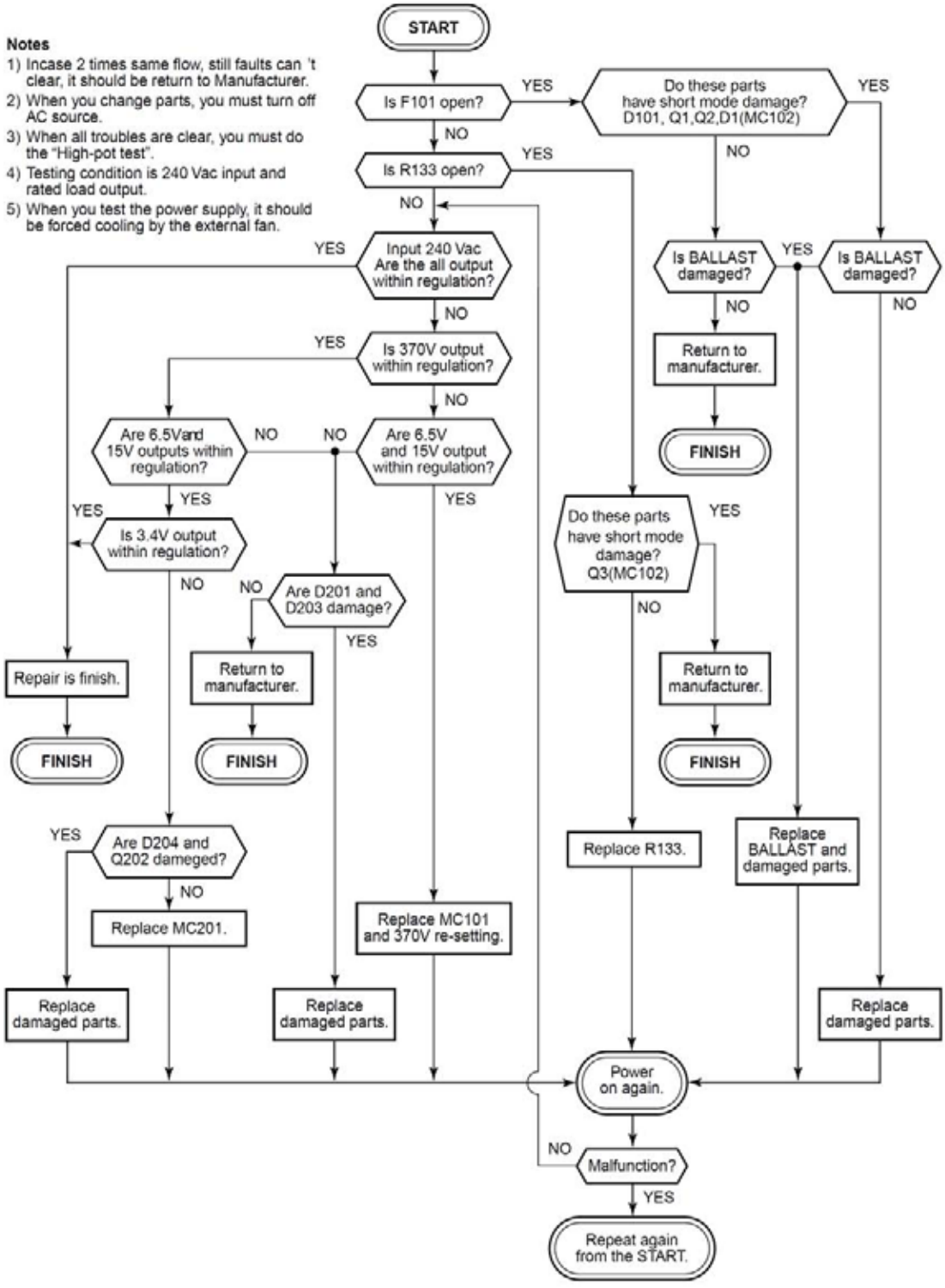
6) Time Sharing Multi-output Control Circuit

This is one of output control method, and 3.4V output is controlled by this method.
Charged primary energy is sent to secondary by transformer T101.Normal1y, one winding power is used for one output only. But this circuit is added the switching device (D204 and Q202) on secondary, It controls switch timing for sharing primary power by MC201.
The voltage of Q202 source is pulsating.D204, Q202 and C207 which smooth out the pulsation to give a low ripple DC output.L201 and C210 are LC filter, which reduce ripple voltage.


INLET
INLET
AKNC176L2=10
F101
C133
C134
Z101
C103
R101
GA
GA
L101
L102
C104
C105
FG
CN103
CN103
AKB2P3=VH
CN103
AKB2P3=VH



APS-M602 (ETXTS602MDA/MDE) Troubleshooting Faults



Electrical Adjustment

Preparation

< Test equipment >

1) Personal computer
   (Windows PC, OS: Windows 98SE, ME, 2000, XP)
2) Signal generating software
   SINGOWS2000.MSI(Installer) and V_Ramp.bmp
3) Cables
   RGB Cable
4) A protractor for Vertical Auto Keystone Calibration

<For connection and setting of Personal computer>

1) Connection of personal computer
   Connect the PC to computer 1 input as shown in following Fig.1
2) Set the screen resolution and refresh rate to XGA (1024x768) 60Hertz.
   Set RGB output of the PC to CRT.

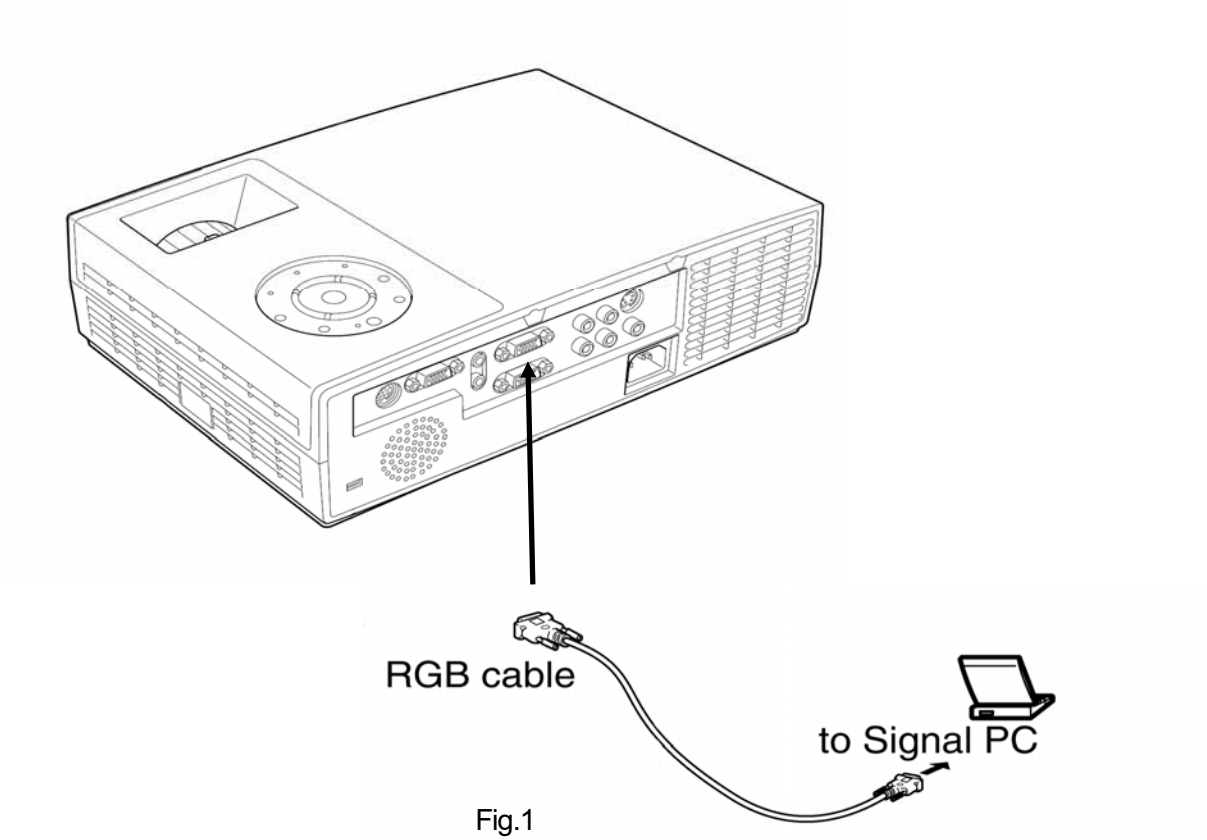


Fig.1

Adjustment Points vs Part Replaced

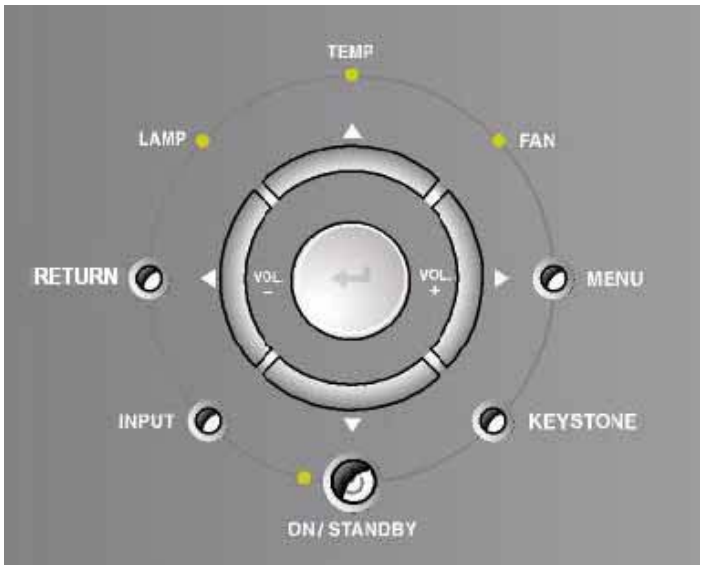
The table below shows you the items to be adjusted according to the type of part you replaced.

Adjustment / Parts	C/W Delay	Keystone	Sub Contrast	Altitude	Lighting Position
Main Board	○	○	○	○	×
Optical Engine	○	×	×	×	×
DMD Chip	×	×	×	×	□
DMD Socket	×	×	×	×	□
DMD Board	×	×	×	×	□
Color Wheel	○	×	×	×	×
LSP (Color Wheel +Light Tunnel)	○	×	×	×	×
C/W Sensor Board	○	×	×	×	×

○ :Adjustment is needed
□ :Check and adjust if necessary
× :Not necessary

<SAVE DATA to EEPROM > (Common on all adjustment)

Press the buttons,
[Up], **[Down]**, **[Left]** and **[Right]** simultaneously.
When these buttons are accepted, all LED's light orange.



Projector Setup

Plug in the power cord; turn on main power switch and the power of the projector.

How to enter to the Factory Mode (TDP-T95/T100)

1) While the Volume adjustment bar is displayed on the screen, set value to **[1]**, and press the buttons, **[Input]**, **[On/Standby]** and **[Keystone]** simultaneously.
2) While the Volume adjustment bar is displayed on the screen, set value to **[0]**, and press the buttons, **[Input]**, **[On/Standby]** and **[Keystone]** simultaneously.
3) While the Volume adjustment bar is displayed on the screen, set value to **[0]**, and press the buttons, **[Input]**, **[On/Standby]** and **[Keystone]** simultaneously.

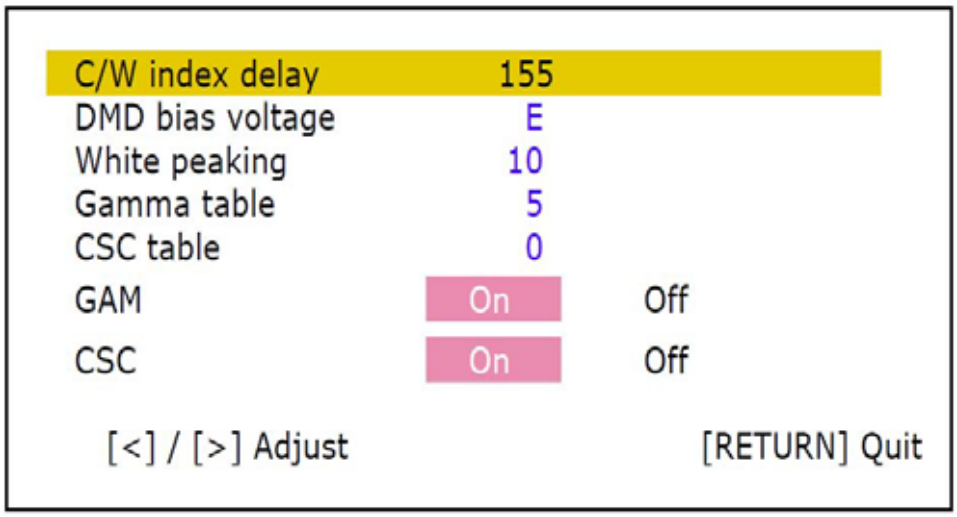
How to display the Service status

After the projector has entered to the factory mode, press the buttons, **[Return]** and **[Up]** simultaneously. Then, the following display appears.
If it doesn't appear, repeat from the beginning.
This mode maintains until you turn off the Main power switch.

Service status (Display only)			[RETURN] Quit
Version (Main - DDP)		1100 - 1000	
User lamp time	1H - 10M - 10S	-> Reset count	0
Panel time	1H - 10M - 10S		
Total time	1H - 10M - 10S		
KC0 28 - 4786 - 2423	KC1	27 - 4799 - 2664	
KC2 27 - 4809 - 2005	KC3	26 - 4331 - 2440	
Sub contrast 97 - 99 - 95			
Fan-1 2824rpm Fan-2 2433rpm		Fan-3 4349rpm	
Fan-4 2978rpm Fan-5 3561rpm			
Temp-1 25deg	Temp-2 64deg		
Engine No.	42000001	Altitude	0
C/W index delay	170	DMD bias	E
Error count	0	Shut down	0
Error log 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0			
Serial No. 63731126		Model name	H55
[Total time] display	Enable	[Password] function	Disable

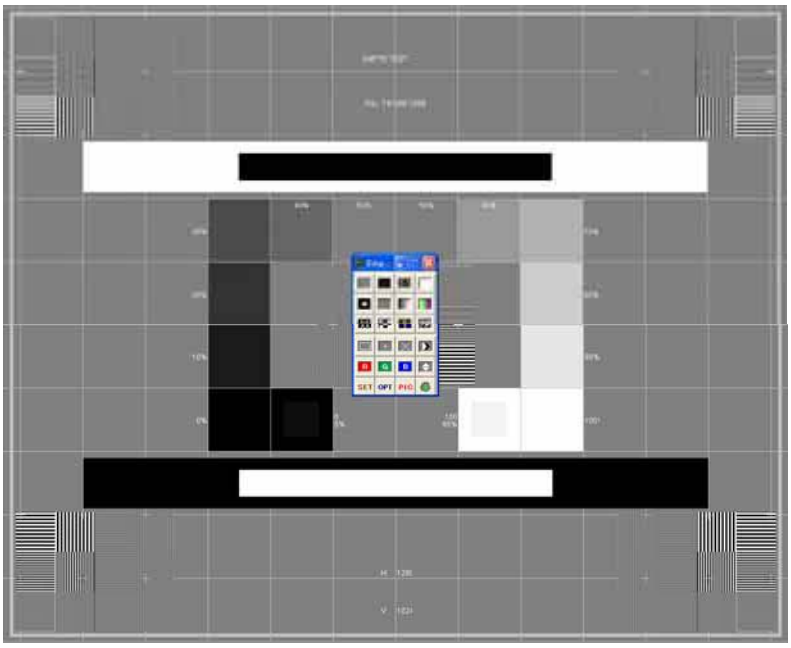
FAN-1 is Z100 (Service part location No.). **FAN-2** is Z101.
FAN-3 is Z102. **FAN-4** is Z104. **FAN-5** is Z103.
Temp-1 is Intake temperature at Sensor Board.
Temp-2 is lamp nearby temperature.
A number of **Error log** means an error ID.

C/W Index Delay Adjustment

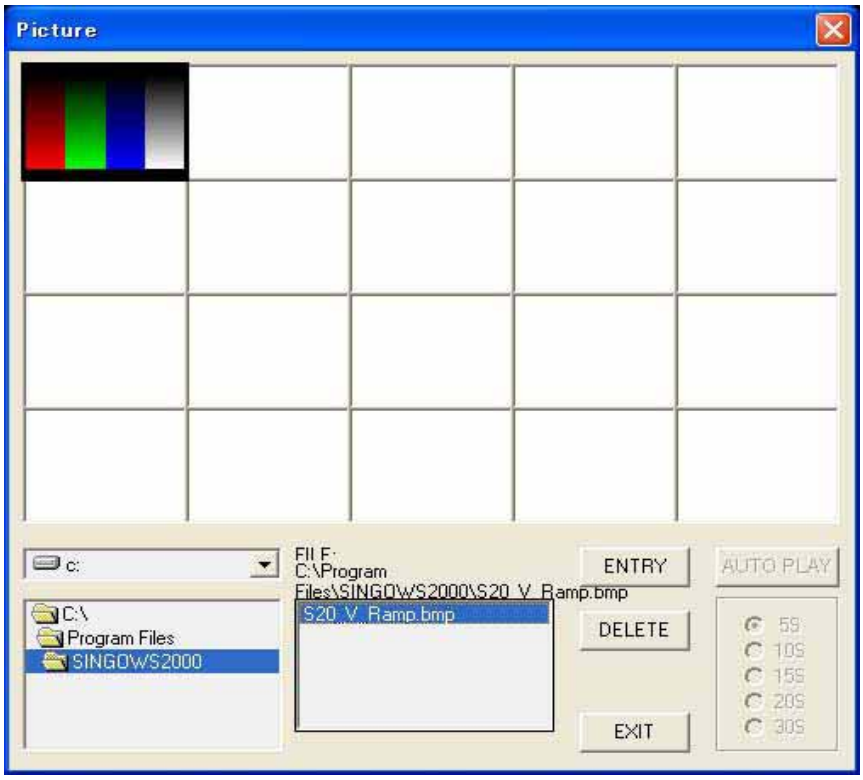


Press **[Return]** and **[Left]** buttons simultaneously.
For it initialize the value, Press **[Keystone]** button.

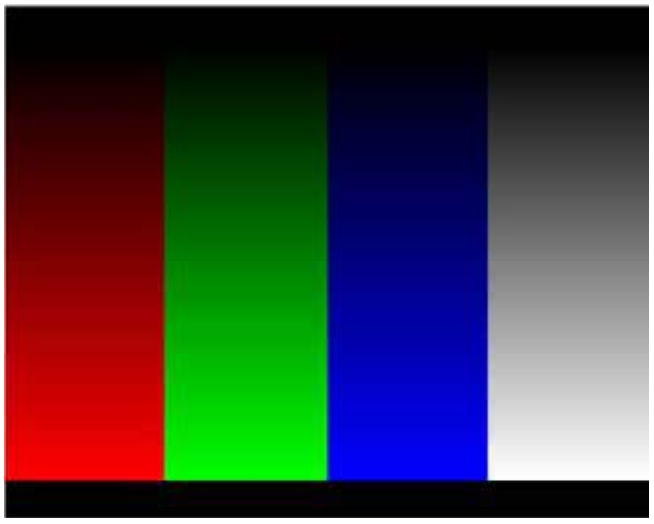
Start the signal generating software (SINGOWS2000.exe),
the following signal pattern appears and click **[PIC]** button.



The following Picture dialog box appears.
Select the downloaded file of **V_Ramp.bmp**.
Click **[ENTRY]** button.



Double click the V_Ramp window, the following V-Ramp signal appears.



Adjust the C/W index delay by pressing **[Left]** or **[Right]** button

<STEP 1> Check on blue.

Read the value when the horizontal stripes (EX. Fig.2) is minimized and the value is referred to "A.".

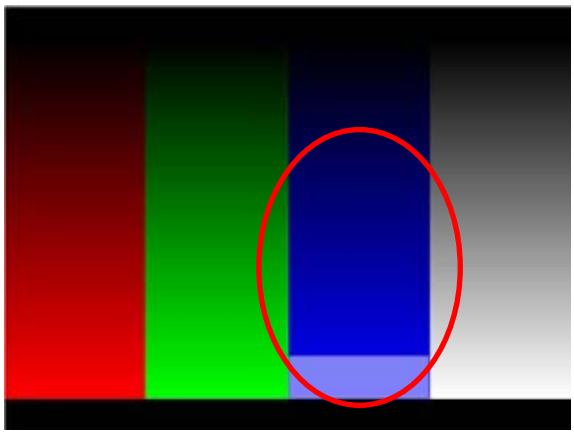


Fig.2

<STEP 2> Check on red.

Read the value when the horizontal stripes (EX. Fig.3) is minimized, and it is referred to as "B."

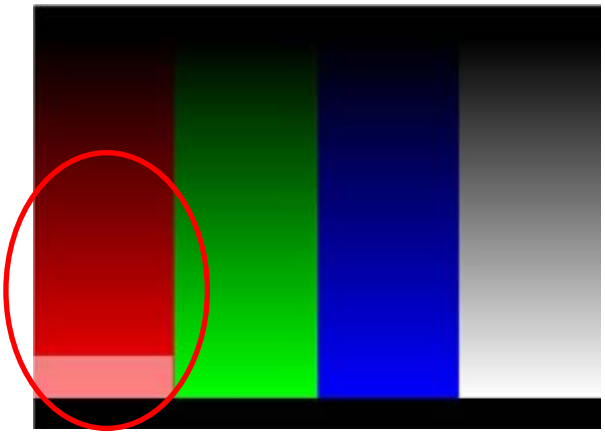


Fig.3

<STEP 3>

Adjust the value to final adjustment value. Final adjustment value = (A+B)/2 (EX. Fig.4)

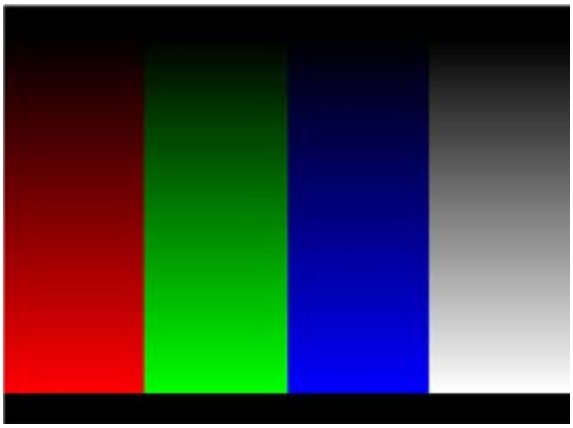
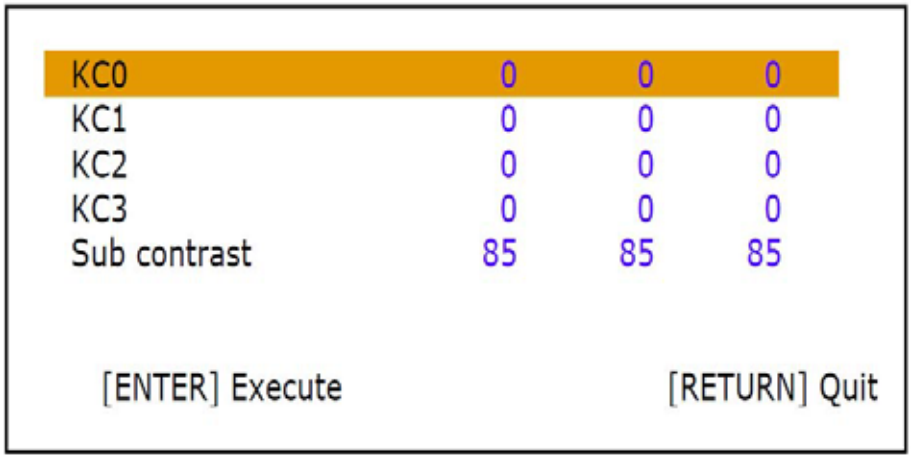


Fig.4

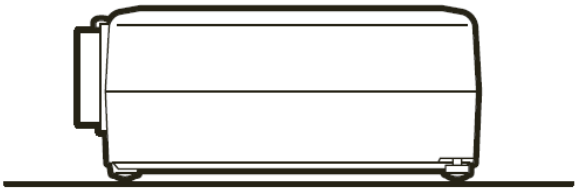
Then, press **[Esc]** key of PC and click **[EXIT]** button of picture dialog box for next adjustment.

<Keystone Calibration>

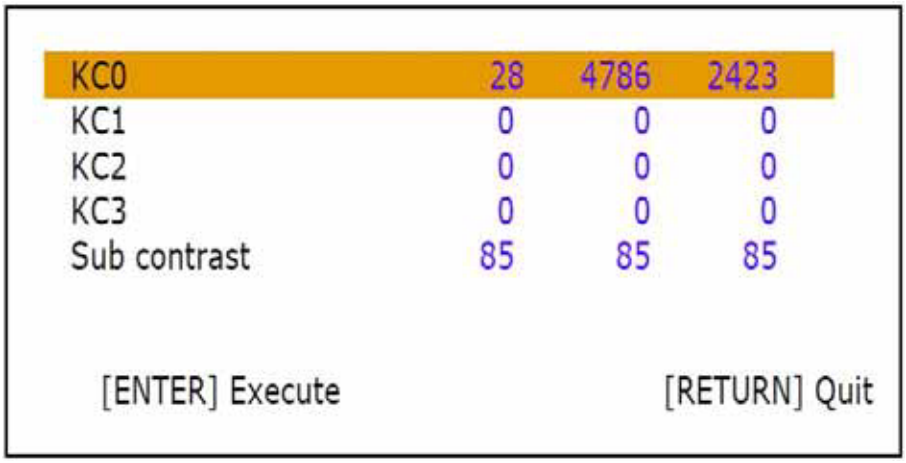
Press **[Input]** and **[Up]** buttons simultaneously.
For it initialize the value, Press **[Keystone]** button.



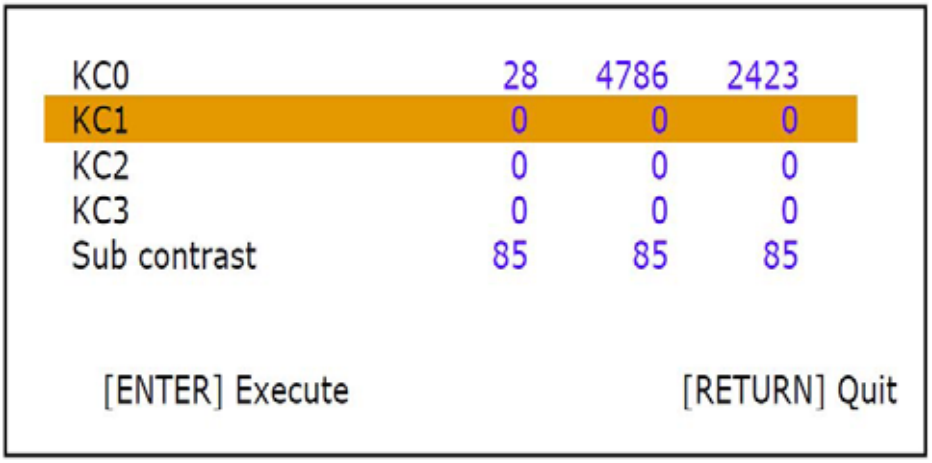
Set the projector on a level surface.



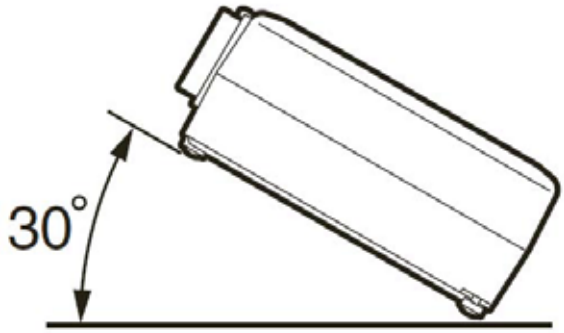
Press **[Enter]** button of the projector.
When the adjustment is successfully completed, values changes from default [0].
(**Example:** The following menu)
If it fails, values don't change from default [0].



Select the **KC1** item by pressing **[Down]** button.



Keep projector on 30 degree.

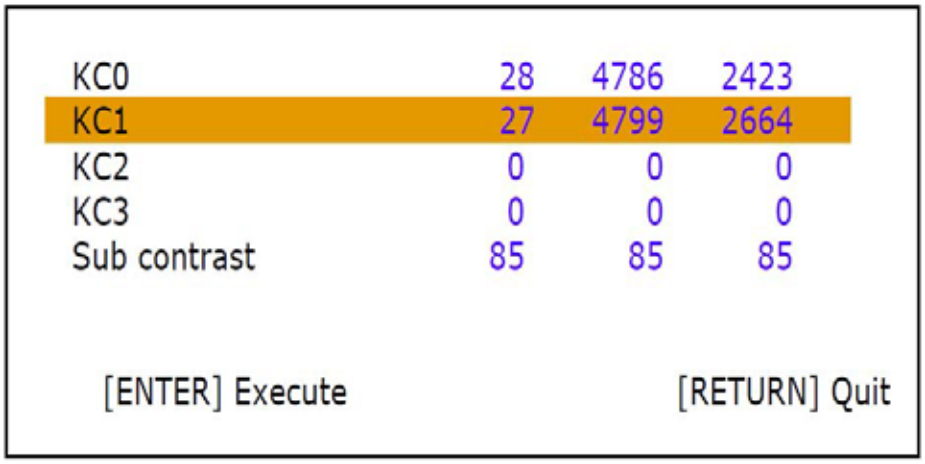


Press **[Enter]** button of the projector.

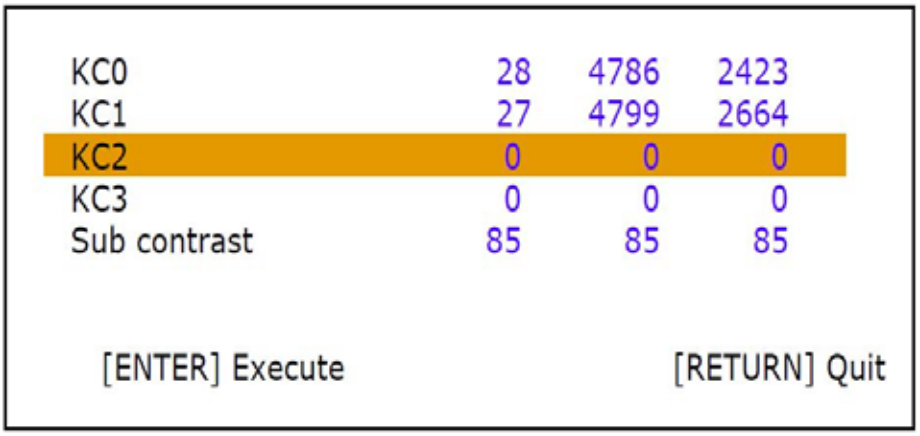
When the adjustment is successfully completed, values changes from default [0].

(Example: The following menu)

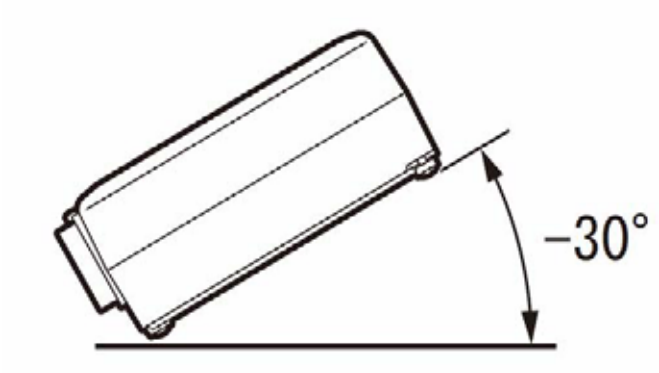
If it fails, values don't change from default [0].



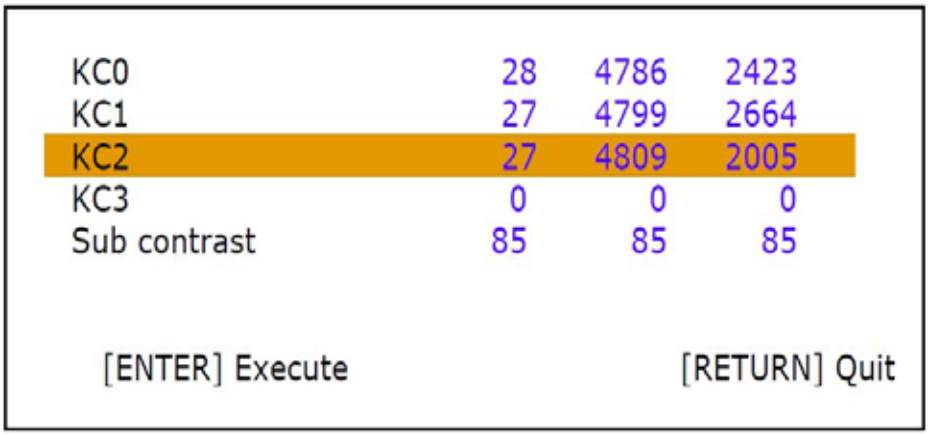
Select the **KC2** item by pressing **[Down]** button.



Keep projector on -30 degree

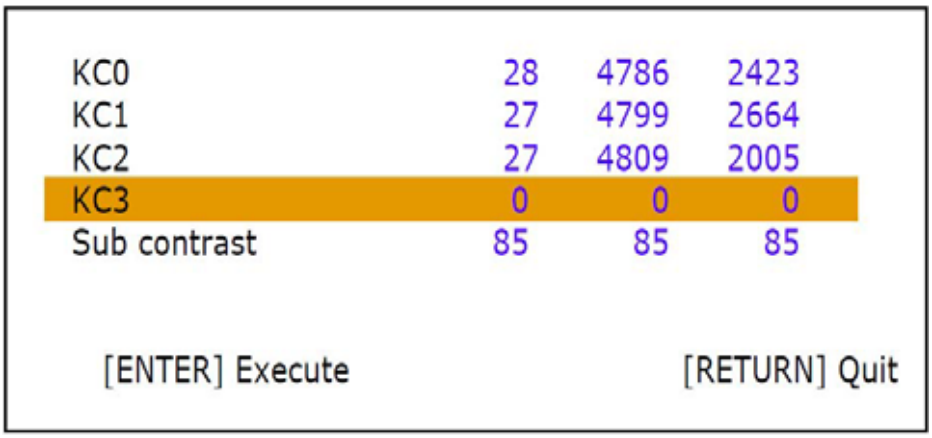


Press **[Enter]** button of the projector.
When the adjustment is successfully completed, values changes from default [0].
(Example: The following menu)
If it fails, values don't change from default [0].

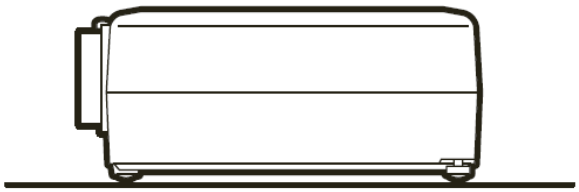


<Note> When the projector is not tilted accurately +/- 30degree,
the adjustment values (**[KC1]** and **[KC2]**) do not change.

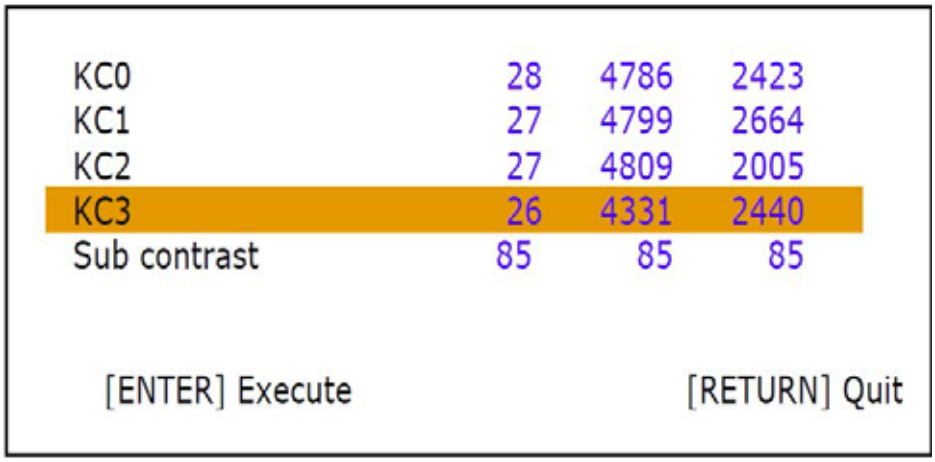
Select the **KC3** item by pressing **[Down]** button.



Set the projector on a level surface and perform heat-run for 30 minutes or more.



Press **[Enter]** button of the projector.
When the adjustment is successfully completed, values changes from default [0].
(**Example**: The following menu)

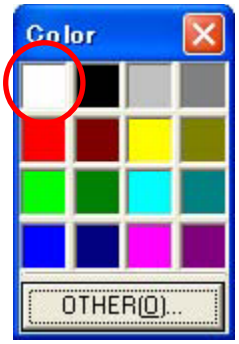


<Sub Contrast>

Right - click to display the following color pallets. Click **[White]** button.

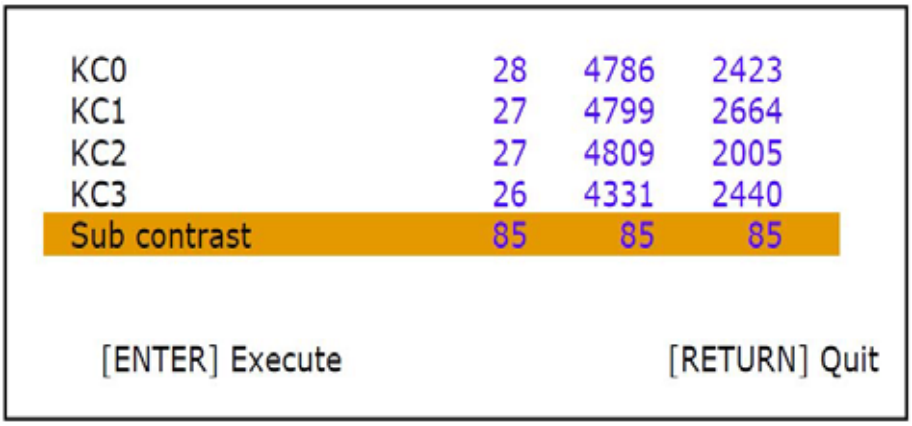
Note:

Move the mouse cursor out of a screen to avoid the error.



Select the Sub contrast item by pressing **[Down]** button.

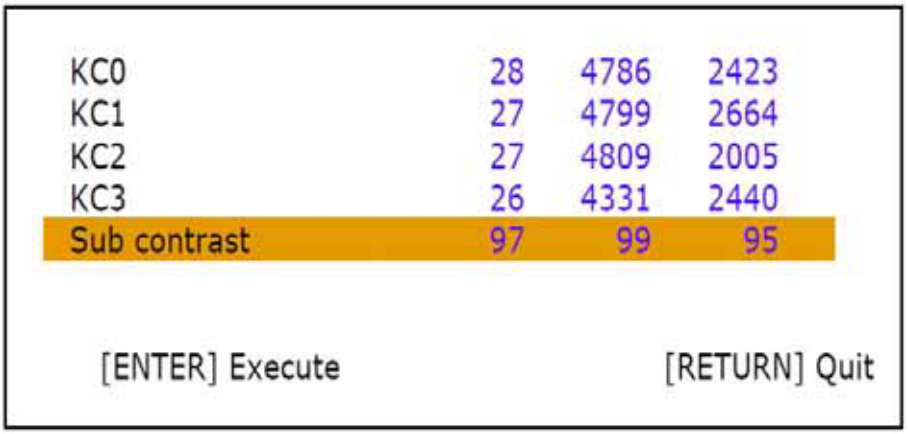
Press **[Enter]** button of the projector.



When the adjustment is successfully completed, values changes from default [85].

(**Example**: The following menu)

If it fails, values don't change from default [85].



<Altitude>

Press **[On/Standby]** and **[Up]** buttons simultaneously.

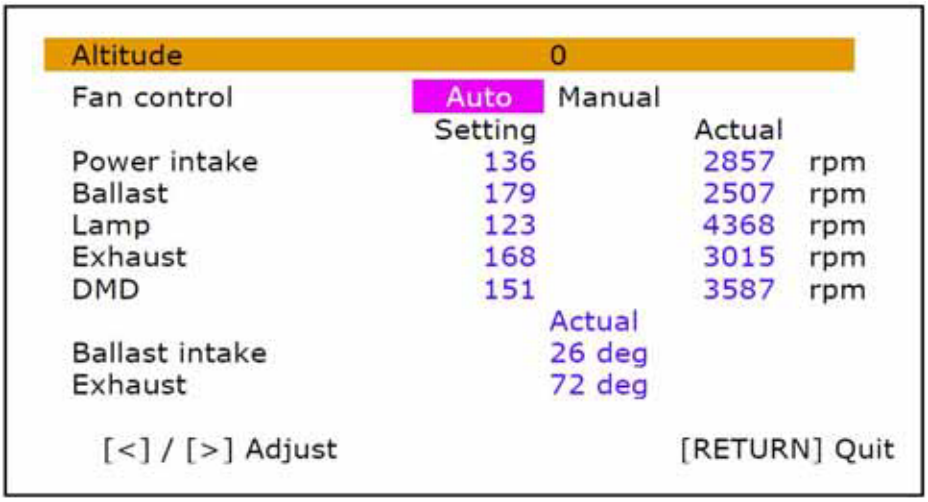
For it initialize the value, Press **[Keystone]** button.

Select proper value by pressing the **[Left]** or **[Right]** button.

Factory setting is 0.

The value 1 is more than 500m (1,640ft) and under 1,000m (3,281ft).
The value 2 is more than 1,000m (3,281ft) and under 1,500m (4,921ft).
The value 3 is more than 1,500m (4,921ft) and under 2,000m (6,562ft).
The value 4 is more than 2,000m (6,562ft) and under 2,500m (8,202ft).
The value 5 is more than 2,500m (8,202ft) and under 3,000m (9,843ft).
The value 6 is more than 3,000m (9,843ft).

For example, in case of 2,700m altitude set the value to 5.



Press **[Return]** button.

Lighting Position Adjustment

When replacing the DMD chip, DMD Board and DMD socket, check the shading error by using the following method.
Use White 100% signal from SINGOWS 2000.
Check the projected image if shading error is observed or not.
It is “Okay” if no shading error is observed otherwise, apply the lighting position adjustment.

Fig.1 Shading is Good

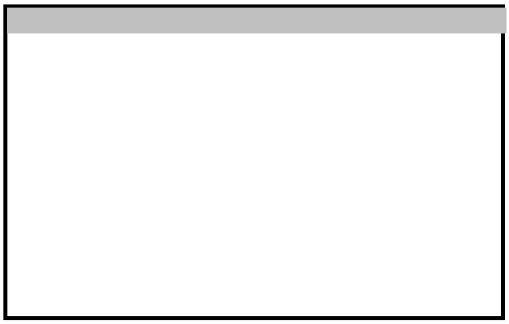


Fig.2 Shading is NG (example)

<Tools>

>Screw Bit(+) :No.0
>Screw Bit(+) :No.2

How to adjust the lighting position

1) The top cover of a projector is removed and the hidden lid of an adjustment hole is removed.

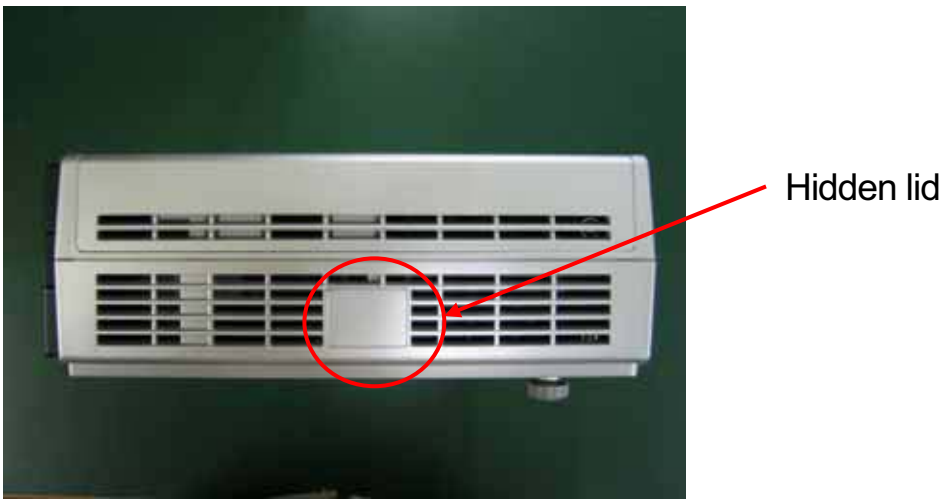


Fig.3 The side of projector

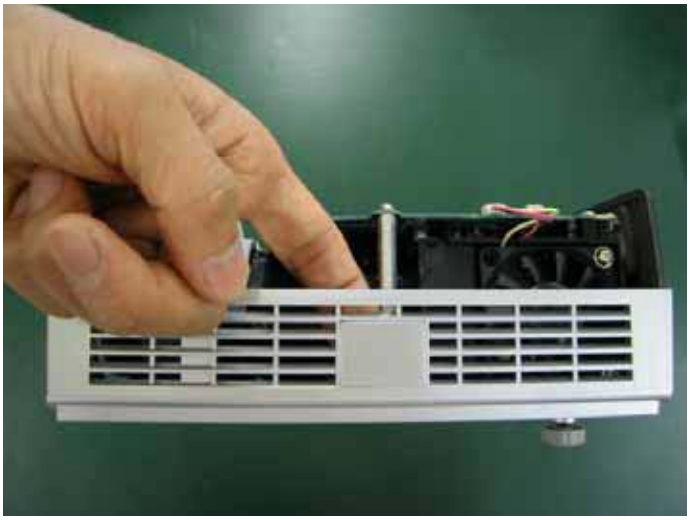


Fig.4 Removal of hidden lid (push with a finger)

2) Use 100% White signal.

3) Three adjustment screws are used, and it adjusts so that a lighting position may become in the center of a screen.

Finally all screws are fastened, and if shading is lost, it will OK.

Fig.5 Adjustment screws

Three screws (A, B, C) have stopped the mirror. The lighting position is adjusted by moving a mirror.

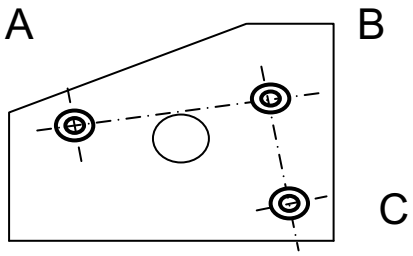


Fig.6 Mirror

4) Bond the screws.

5) Confirm the picture again by using White 100% signal.

Functional Test

You perform the functional tests after you've repaired the projector to make sure
All components of the projector operate properly.
You can also perform the functional tests if you're having trouble determining what is wrong with the projector.

Required Equipment

Equipment	Notes
Video player	Make sure the video player has an S-video Out port and cables. The player should also have a Composite video port (RCA). Toshiba strongly suggests you use a DVD player to test the Video quality. DVD players reproduce colors better and project Sharper images. The least preferable is a VCR.If you must use a VCR, make sure you use a commercially produces recoding not one recorded from a broadcast source. The VCR must include an S-Video connector in addition to a composite connector.
Commercially produced video	You'll need the video in DVD, etc. format.
Cables	1. RCA Pin jack cable for Composite video & audio. 2. S-video cable. 3. RGB cable that come with the projector. 4. 3.5mm mini-jack cable for PC audio.
Remote control	Ensure that the remote has fresh AAA batteries.
Projector screen	Use a flat screen, not a curved one.
Personal computer (PC)	The stereo audio card should have either a 3.5mm stereo audio Jack or RCA left and right output ports. The PC must have a CD-ROM and must have outputs for RGBHV, VESA, D-sub15pin.

Before beginning

Make sure the work surface where you perform the functional tests is level and clean.
Place the projector on a soft surface (such as an anti-static mat) when running the tests.

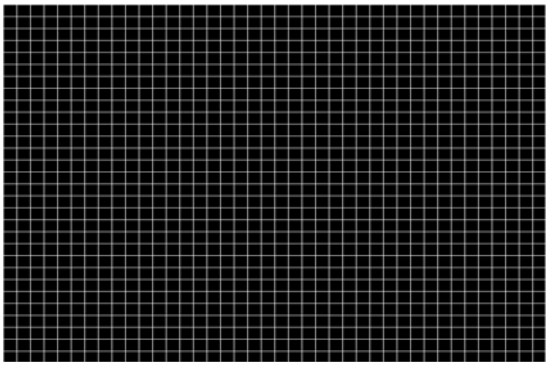
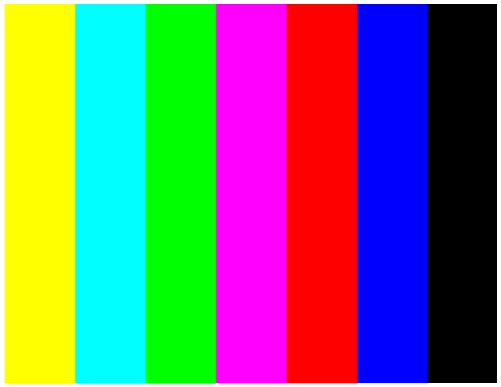
Connect the following the I/O panel on the projector.

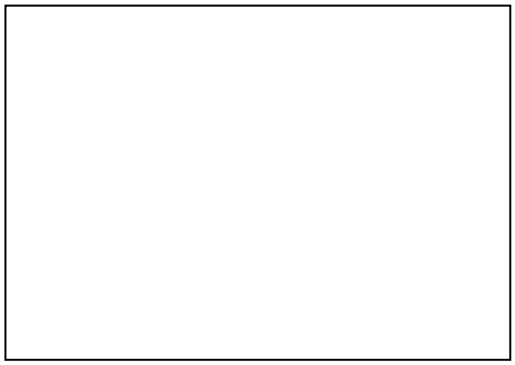
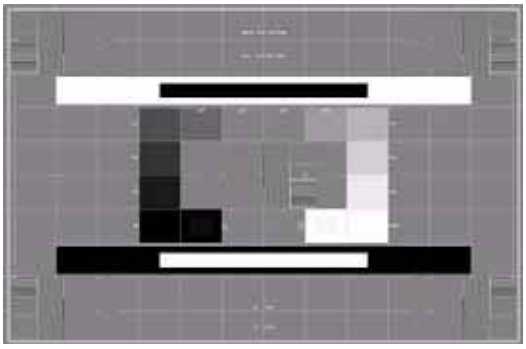
1. Video player through Composite Video and S-video ports.
2. Audio sources through Audio ports (RCA) or 3.5mm mini-jack.
3. Personal computer through RGB cable

.

Perform the following tests

Test	Verification
Power Up Connect AC power, and turn the unit on.	Verify that the proper splash (logo) screen Appears. Verify image quality.
Cosmetics and mechanicals Adjust the projector so that the image is Square. Make sure the lens is at a 90 degree angle to the wall.	Verify that the elevator and leveling foot Are functional. Verify that the focus and zoom rings operate properly. Verify cosmetics.
Composite video from video source Connect the yellow composite (RCA) video Connector to the projector. (Ensure that no other video source is connected to the projector)	Verify that the video automatically synchronizes. Verify there is no distortion, noise or other abnormalities.
S-Video from video source Connect the S-Video cable to the projector. Disconnect the yellow composite (RCA) Video connector.	Verify that the video automatically synchronizes. Verify there is no distortion, noise or other abnormalities.
Image keystone adjustment Connect a video source to the projector.	Verify that image responds properly when You adjust the keystone setting.
Audio from audio source Connect the audio cable to the projector.	Verify that audio source plays through the projector's speaker. Verify that the volume controls function correctly.
Manual source selection Manually select a connected source.	Verify that the projector switches to the manually-selected source. Verify that the video automatically synchronizes. Verify there is no distortion, noise or other abnormalities.
Software Version / Lamp time Used Navigate through the Basic menu to the Setup menu. Navigate to the Service menu. Select info from the Service menu.	Verify software version Verify the keys are not sticky. Verify that the software version is current and that the lamp is within its service life.

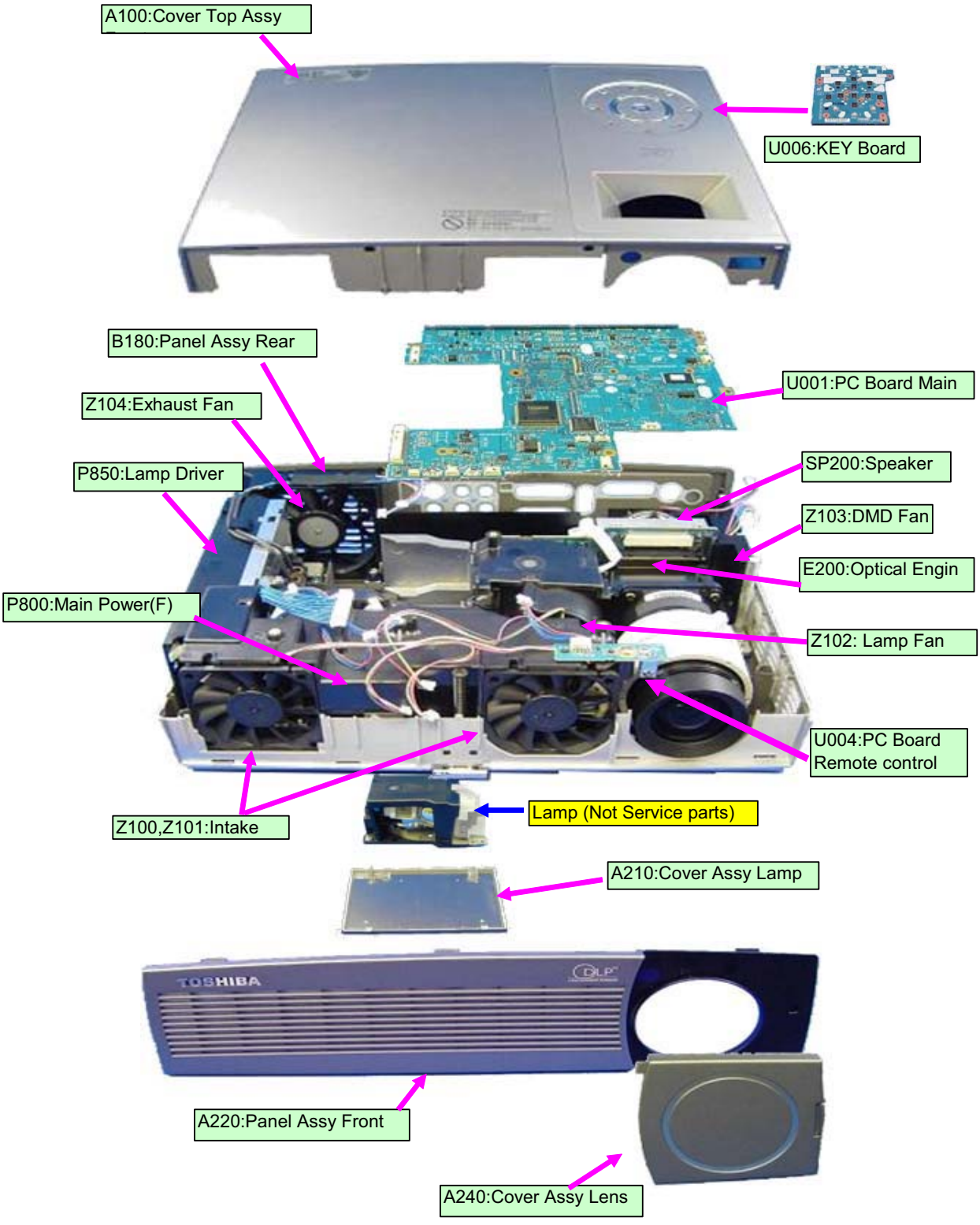
Test	Verification
Focus SINGOWS2000 Cross Hatch image.	Verify that the image synchronizes properly through the computer 1 input.  Verify that image focuses through the full zoom range. Verify there are no problems.
Color Wheel Index Delay SINGOWS2000 Color bar image.	Verify that the image synchronizes properly through the computer 1 input.  Verify that the color is located in a line. Verify there are no problems

Test	Verification
DMD Images SINGOWS2000 White image (Level 100%) SINGOWS2000 Black image (Level 0%) SINGOWS2000 SMPTE image	Verify that each image synchronizes properly through the computer 1 input.    Verify there are no problems
System Reset On the keypad, press the Menu key. Navigate through the basic menu to the default setting menu. Select Reset all.	Verify that the image synchronizes after system reset.
Power Down After all tests are complete turn the power off and disconnect all cables. Attach the lens cap.	Verify unit is powered off before disconnecting cables.

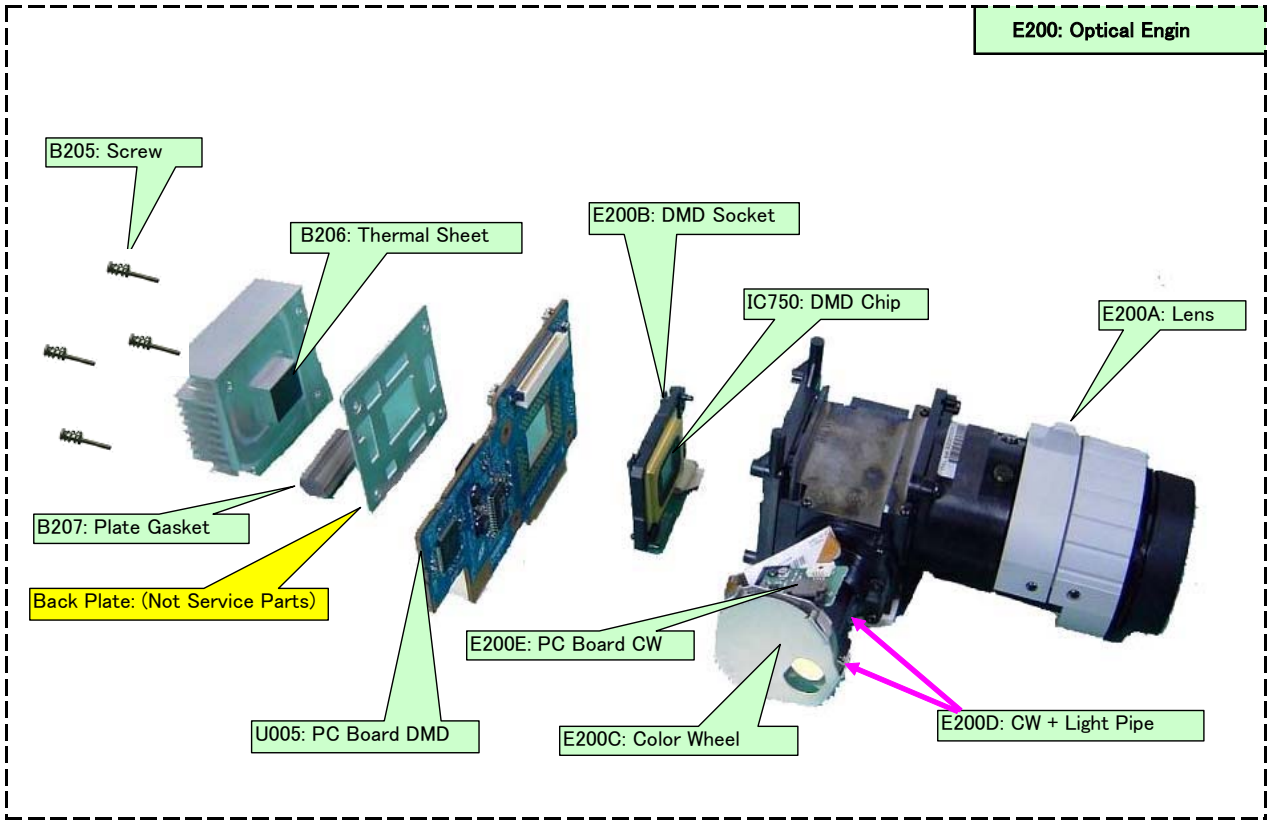
Chapter 9

Spare Parts List

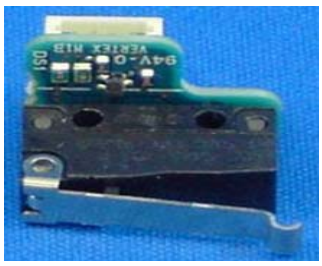
Exploded View



Exploded View(Optics Block)



Other Parts

U002 **PCB Door SW**	
U003 **PCB Sensor**	
MJ03 **Thermo SW**	

Spare parts list (T95 Series) GREEN

No	Location	Description	Part No			
			E	B	U	CH
1	U001	PCB MAIN	75001853			
2	U002	PCB DOOR SW	75001854			
3	U003	PCB SENSOR	75001855			
4	U004	PCB REMOTE CONTROL	75001856			
5	U005	PCB DMD BOARD	75001847			
6	U006	PCB KEY SW	75001848			
7	A100	COVER, TOP ASSY	23571133			
8	A101	BUTTON, CONT CENTER	23445978			
9	B100	COVER, BTM ASSY	23571136			
10	B180	PANEL, ASSY REAR T95	23450894			
11	A210	COVER, ASSY LAMP	23571150			
12	A220	PANEL, ASSY FRONT T95	23450904			
13	A240	COVER, ASSY LENS T95	23571152			
14	A702	TAPE	23969946			
15	Y100	CABLE, RGB CABLE	23368955			
16	Y300	CABLE, ST-MINI--ST-MINI 3M	23368798			
17	Y301	CABLE, MINI-PINX2 3M	23368799			
18	Y700	REMOCON HAND UNIT CT-90246	23306650			
19	Y702	REMOCON RECEIVER CR-916	23306621			
20	Y200	OWNERS MANUAL CD-ROM	23566891			
21	Y201	OWNERS MANUAL E/F/S/G	23566888			23566890
22	Y260	POWER CORD	23372167	23372337	23372148	23372155
23	MJ03	THERMO SW	23520074			
24	MJ09	CABLE, FFC CABLE SHIELD	23389372			
25	P800	P0WER UNIT, FILTER	23122517			
26	P801	P0WER UNIT, MAIN	23122518			
27	P850	P0WER UNIT, LAMP DRIVER	23122514			
28	SP200	SPEAKER	23351359			
29	Z100	FAN, D06R-12SH 13A INTAKE	23125957			
30	Z101	FAN, D06R-12SH 14A INTAKE	23125958			
31	Z102	FAN, LAMP	23125960			
32	Z103	FAN, DMD	23125959			
33	Z104	FAN, EXHAUST	23125961			
34	B202	INSULATOR, DMD	23469414			
35	B205	SCREW, ASSY DMD	23717449			
36	B206	PAD, 1210AP 18.6X15.3	23937079			
37	B207	PLATE, GASKET	23936214			
38	E200	OPTICAL ENGINE	23405623			
39	E200A	LENS, 1642-LENS	23405630			
40	E200B	SOCKET, 1641-SOCKET	23903271			
41	E200C	COLOR WHEEL	23125962			
42	E200E	PC BOARD ASSY, COLOR WHEEL	23759038			
43	E210	OPTICAL FILTER, UVF-T100	23405625			
44	E251	OPTICAL FILTER, ARG-T100	23405624			
45	A400	CARTON BOX, TDPT95	23015354			
46	A405	CASE, SOFT T95	23448750			
47	IC1402	IC, A8904SLBTR-T	75001234			
48	E(R398)	TAPE, CC #12 10MM L30M	23965241			
49	IC108	IC, BR24L16F-WE2	75001222			
50	IC111/122/123	IC, TC7SH08FU(TE85L,F)	75001245			
51	IC350	IC, TC7WBD126AFK	75001220			
52	IC360	IC, M62334FP DF5J	75001226			
53	IC509	IC, LM2660MM	75001237			
54	IC6001/6002	IC, NJM2370U1-09-TE1	75001239			
55	IC6012	IC, TC7SH08FU(TE85L,F)	75001245			
56	IC700	IC, CDCR83DBQR	75001232			
57	IC701	IC, K4R271669F-TCS8	75001221			
58	IC710	DLP IMAGE PROCESSOR	75001225			
59	IC711	INVERTER	75001219			
60	IC713/715	IC, TC7SH08FU(TE85L,F)	75001245			
61	IC717	IC, TPS3307-25DGNRG4	75001242			
62	IC1100	IC, PNA4612MO1TH	75001241			

Spare parts list (T100 Series) GREEN

No	Location	Description	Part No			
			E	B	U	CH
1	U001	PCB MAIN	75001849			
2	U002	PCB DOOR SW	75001850			
3	U003	PCB SENSOR	75001851			
4	U004	PCB REMOTE CONTROL	75001852			
5	U005	PCB DMD BOARD	75001847			
6	U006	PCB KEY SW	75001848			
7	A100	COVER, TOP ASSY	23571133			
8	A101	BUTTON, CONT CENTER	23445978			
9	B100	COVER, BTM ASSY	23571136			
10	B180	PANEL, ASSY REAR T95	23450898			
11	A210	COVER, ASSY LAMP	23571150			
12	A220	PANEL, ASSY FRONT T95	23450906			
13	A240	COVER, ASSY LENS T95	23571153			
14	A702	TAPE	23969946			
15	Y100	CABLE, RGB CABLE	23368955			
16	Y300	CABLE, ST-MINI--ST-MINI 3M	23368798			
17	Y301	CABLE, MINI-PINX2 3M	23368799			
18	Y700	REMOCON HAND UNIT CT-90246	23306650			
19	Y702	REMOCON RECEIVER CR-916	23306621			
20	Y200	OWNERS MANUAL CD-ROM	23566891			
21	Y201	OWNERS MANUAL E/F/S/G	23566888			23566890
22	Y260	POWER CORD	23372167		23372148	23372155
23	Y261	POWER CORD		23372337		
24	MJ03	THERMO SW	23520074			
25	MJ09	CABLE, FFC CABLE SHIELD	23389372			
26	P800	P0WER UNIT, FILTER	23122517			
27	P801	P0WER UNIT, MAIN	23122518			
28	P850	P0WER UNIT, LAMP DRIVER	23122515			
29	SP200	SPEAKER	23351359			
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55	IC6001/6002	IC, NJM2370U1-09-TE1	75001239			
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61	IC713/715	IC, TC7SH08FU(TE85L,F)	75001245			
62	IC717	IC, TPS3307-25DGNRG4	75001242			
63	IC1100	IC, PNA4612MO1TH	75001241			

TOSHIBA CORPORATION
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-8001, JAPAN